AVIATION WEEK

A McGRAW-HILL PUBLICATION

MAR. 17, 1952

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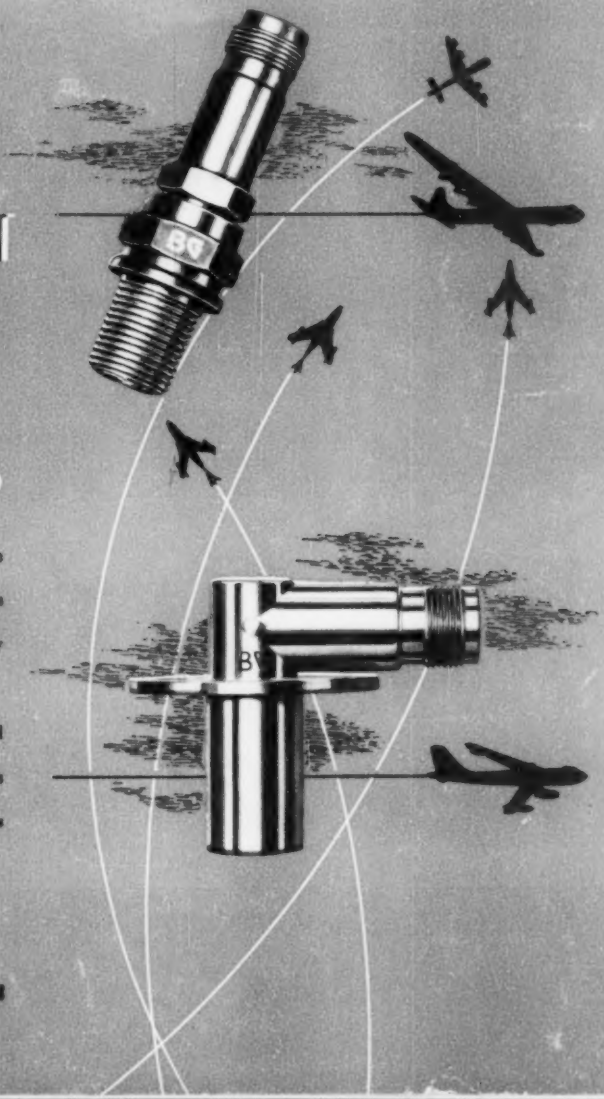

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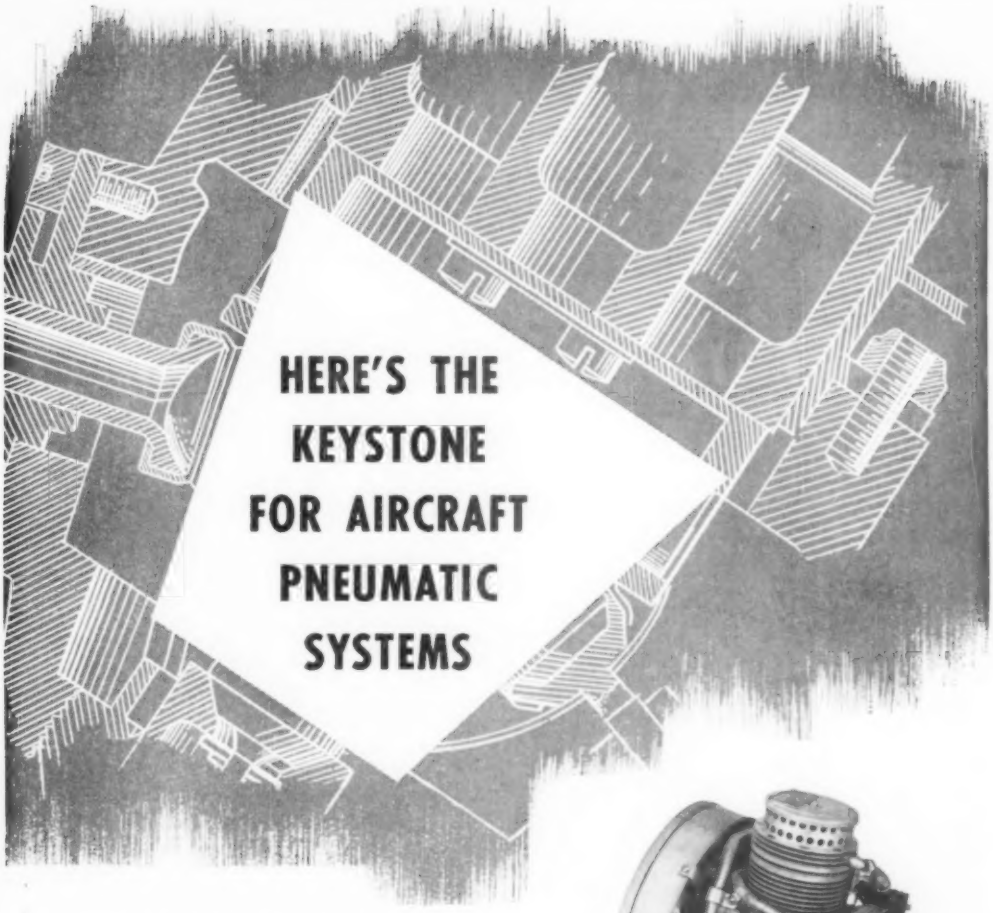

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The new four-stage lightweight Kidde compressor has an exceptionally low starting torque. The patented keystone drive permits several revolutions of the shaft before the second, third and fourth stages are brought into compression position. This, of course, reduces the starting load on the motor to a minimum. An automatic bleed valve also serves to relieve pressure on the first cylinder during the starting cycle.

This compressor has opened up a new field for pneumatics in aviation. It delivers one cfm of free air compressed to 3,000 psi from ambient pressure at 35,000 feet altitude. At sea level it will deliver four cfm.

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SPECIALISTS IN AIRCRAFT, AUTOMOTIVE AND MARINE IGNITION SHIELDING

Aviation Week

ABP Member ABC

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First U.S. Air Mail Flight-1911

Wearing a football helmet and straddling fifteen pounds of souvenir postcards Earl Ovington, back in 1911, made the first official United States Air Mail flight—from Garden City to Mineola, Long Island (N. Y.) He flung the souvenir mail out over the crowds after taking off from the International Aviation Meet—and his postcard drop made history!

● Just as air transportation has made miraculous advancements since the days of the first air mail flight—so has petroleum.

Phillips Petroleum Company has kept pace with the developments of the aviation industry—for airplane engines can only operate within the limits of the fuel that powers them. Today Phillips is one of the nation's largest producers of aviation gasoline for both military and commercial planes. With each new development, Phillips is ready with new fuels to meet the latest demands.

Rely on Phillips when you want dependable aviation products.

AVIATION DIVISION
PHILLIPS PETROLEUM COMPANY
BARTLESVILLE, OKLAHOMA

FORTY YEARS LATER in September, 1951, a twin-pontooned helicopter belonging to the Port Authority of New York made the same trip commemorating the 40th Anniversary of Ovington's first air mail flight. This time the cargo was 1500 air mail letters destined to board a trans-continental airliner at LaGuardia Airport, headed for points west.

Phillips 66

AVIATION PRODUCTS

RESISTANCE WELDING HIGH-TEMPERATURE ALLOYS?

General Electric can help you in the proper selection of resistance welding control—single-phase and three-phase

Are you faced with resistance welding high-temperature, high-strength alloys or aluminum for defense production? Trying to decide between three-phase and single-phase welding control? Write for G-E literature that describes both types. We know, from experience in our own as well as customers' plants, that both are being used. Which *you* select will depend to a great extent on these factors:

COMPARE SINGLE-PHASE AND THREE-PHASE

Single-phase	Three-phase
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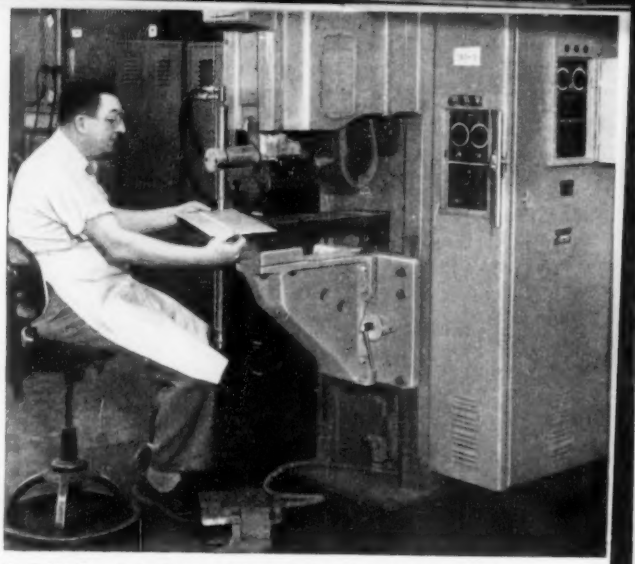
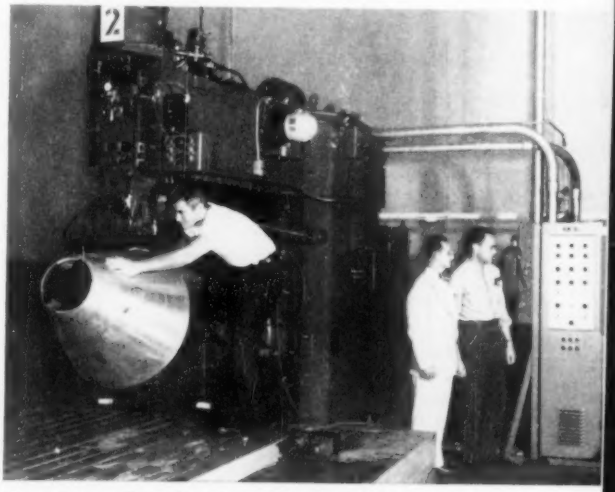
3. Simple to operate (few adjustments)	3. High power factor
4. Wide industry use	4. Inherent slope control action
5. Voltage and current regulators can be added later	
6. Slope control can be added if necessary	

General Electric has supplied, and used, both types to meet Army-Navy specifications, and our nearest local office can give you information based on experience with this equipment and with welding high-strength alloys. Before you buy investigate. Contact the nearest G E sales office or write for Bulletin GED 1512 to Section A645-55, *General Electric Co., Schenectady, N.Y.*

Ask your resistance welding manufacturer, power supplier, or nearest General Electric office for a FREE showing of the sound and color movie, "This Is Resistance Welding." Describes various welding methods and processes. For production and engineering personnel training and refresher courses.



H. C. Wolfe, of the General Electric Electronics Laboratory Welding Section, says, "Tests in our Laboratory and in other General Electric Welding Laboratories showed that single-phase a-c welding using Slope Control was as good as three-phase welding on aluminum. So, for Class A spot welding of aluminum, the use of our a-c machine with Slope Control certified to Military Specification MIL-W-6860 for .125-.125" 52S$^{1}_{4}$H aluminum has resulted in a considerable saving of money and time."



Three-phase at Ryan Aeronautical Company in San Diego controls several of the largest resistance welding machines in the country. With G-E 3-phase control exact heat settings can be obtained and duplicated later without variation. Uniform current is fed to the electrodes to produce the required heat with less momentary line load. Unidirectional spot welding is also obtained—advantageous when welding sheets of different thicknesses.

GENERAL ELECTRIC

A45-55

NEWS DIGEST

DOMESTIC

2,000th F-84 Thunderjet has been delivered to USAF by Republic Aviation Corp. This is the greatest number produced in this country of a single type of jet aircraft, although Lockheed, with its record of 1,700 F-80s, plus output of T-33 and TV-2 (TO-2) trainers, and F-94s has made a larger number of the Shooting Star in all its variants.

Edwin V. Huggins, Assistant Secretary of the Air Force has been named as the Air Force member of the Air Coordinating Committee. He replaces Roswell L. Gilpatric on the committee.

Army Corps of Engineers has transferred more than $7 million in equipment and facilities to Air Force at Wichita Municipal Airport, Kan. The facilities include 125 acres of heavy reinforced concrete runways, taxiways, and a 93-acre parking ramp. Four miles of railroad lines and standings are also involved in the transfer, Army said. A total project expenditure of $22 million has now been completed at that base. The airport is being used by the Air Force as a B-47 advanced flying school.

Dr. Theodore von Karman, for the past seven years chairman of USAF's Scientific Advisory Board, has been named chairman of the recently organized North Atlantic Treaty Organization's Advisory Group for Aeronautical Research and Development (AGARD). The new group, composed of leading scientists from NATO, will have its headquarters in Paris.

Succession to the position of Secretary of Defense, in the event of the death, disability or absence of the Secretary of Defense was set out last week by executive order of the President. The following officers, Truman ordered, would succeed, in the order named: Deputy Secretary of Defense; Secretary of the Army; Secretary of the Navy; Secretary of the Air Force.

L. B. Daniels, San Francisco Manager of United States Aviation Underwriters, died Feb. 22 at San Mateo, Calif., after a heart attack. Holder of a commercial pilot's license, Daniels had been for many years an insurance counselor for Continental Air Lines, and became a member of the carrier's board of directors in 1946.

FINANCIAL

Glenn L. Martin Co. reports net loss for 1951 of over $22 million on sales billings of $68.5 million. Billings in 1950 came to a little over $40 million. Company backlog at year-end stood at $400 million. Stockholders will be asked to approve details of financing plan and authorize increase of common stock to 3 million shares from 1.5 million, at Apr. 2 meeting.

Curtiss-Wright Corp. reports $6.9 million net income after taxes on sales of $176.6 million in 1951. Last year's net was $7.3 million. Income before taxes was nearly $15 million, up from $13.6 million last year. Total unfilled orders, plus scheduled production under letter contracts, comes to $1,025 million.

Hiller Helicopters 1951 net profit, free of taxes, is $120,779 on sales of $6.7 million. Sales in 1950 were $1.26 million; in 1949, $557,000. Company employment rose to 700 in 1951 from 150 in 1950.

Garrett Corp. has declared 40-cent dividend payable Mar. 25 to stockholders of record Mar. 10.

Jack & Heintz, Inc. has declared regular quarterly dividend of 50 cents on its cumulative preferred stock, 4% series ($50 par). Dividend is payable Apr. 1, to stockholders of record Mar. 20.

Electric Boat Co. has increased its usual 25-cent quarterly dividend to 50 cents. Consolidated backlog of Elco and its subsidiary, Canadair, Ltd., is about $334 million. Stockholders are being asked to vote on reorganization of company into a Delaware corporation with the probable name of General Dynamic Corp.

Slick Airways reports 1951 gross revenues of nearly $13 million, with net earnings of $353,000 after tax and inventory adjustments. Slick boosted its 1950 ton miles of revenue freight by 49%, to 67,890,612. Carrier has completed retirement of its 4% debentures by conversion to $10 par value common, increasing outstanding common shares to 422,152.

Solar Aircraft Co. net for the nine months ended Jan. 31 was $922,000, on sales of $36 million, after provision of $3.5 million for taxes and refunds on government contracts. Figures for similar period last year were: net, $563,000; sales, $16.5 million; tax provisions, $1.3 million. Backlog on Jan. 31 was $87 million.

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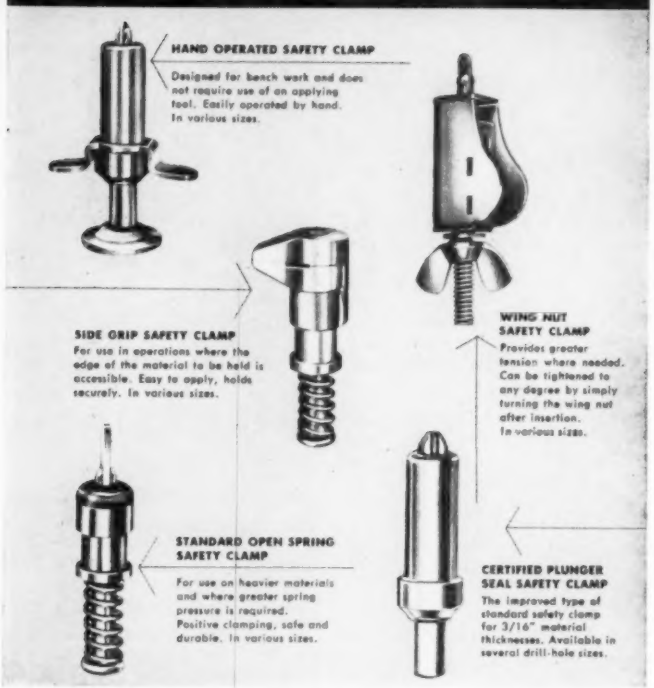
standard of the aircraft industry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3H safety CLAMPS

AVIATION CALENDAR

Mar. 17-19—Second Midwestern Conference on Fluid Mechanics, to be held at Ohio State University.

Mar. 17-21—American Society of Tool Engineers industrial exposition and annual meeting. Theme: "Tooling for Security," Chicago. (For information, write Denham & Co., 812 Book Building, Detroit.)

Mar. 20—Institute of the Aeronautical Sciences Los Angeles section dinner meeting; speaker—Wellwood Beall, Boeing Airplane Co.; Los Angeles.

Mar. 20-21—Conference, Cooling of Airborne Electronic Equipment, to be held at Ohio State University in cooperation with USAF. Technical papers will be presented by AF, electronics and aircraft industries, and research organizations; Ohio State University, Columbus.

Mar. 20-22—Aircraft Operators Council annual conference, Hollywood Roosevelt Hotel, Hollywood, Calif.

Mar. 21—Institute of Navigation eastern regional meeting, U. S. Naval Academy, Annapolis, Md.

Mar. 24-26—American Society of Mechanical Engineers spring meeting, University of Washington, Seattle.

Mar. 30-Apr. 3—Convention of American Association of Airport Executives, Ft. Worth.

Mar. 31—Technical Societies Council of N. J. annual conference; panels on metal working and quality control; Essex House, Newark, N. J.

Apr. 1-4—22d annual Greater New York Safety Convention & Exposition, Hotels Statler and New Yorker, New York.

Apr. 3—Conference on safety problems of aviation, in connection with 22d annual Safety Convention of Greater New York Safety Council; Col. Gilbert E. Teal, USAF, will preside; Hotel Statler, New York.

Apr. 15-18—International Federation of Airline Pilots' Assns. annual convention, Sydney, Australia.

Apr. 21-24—National Aeronautic Meeting and Aircraft Engineering Display, Society of Automotive Engineers, Hotel Statler, New York.

Apr. 22—Institute of the Aeronautical Sciences meeting, Cleveland-Akron section, Cleveland.

Apr. 28—International Air Transport Assn. Warsaw Convention special committee meeting, Bermuda.

May 8-9—Fifth annual Wisconsin Aeronautics Conference, Green Bay.

May 11—International Air Transport Assn. traffic committee meeting, Buenos Aires.

May 12-14—National conference on airborne electronics, co-sponsored by Institute of Radio Engineers' Dayton section and Professional Group on Airborne Electronics, Dayton-Biltmore Hotel, Dayton, Ohio.

PICTURE CREDITS

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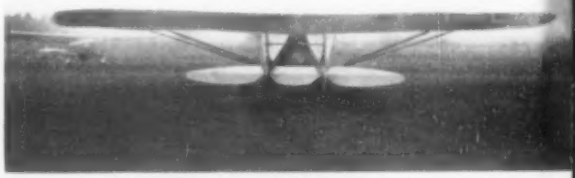
FIRST OF THREE FOR ALGERIE—Now in service between Toulouse, France and Algiers, this Breguet 761 Deux Ponts is the first of a fleet for Air Algerie. The carrier expects to take delivery of two more of the four-engine, double-deck transports before this summer.

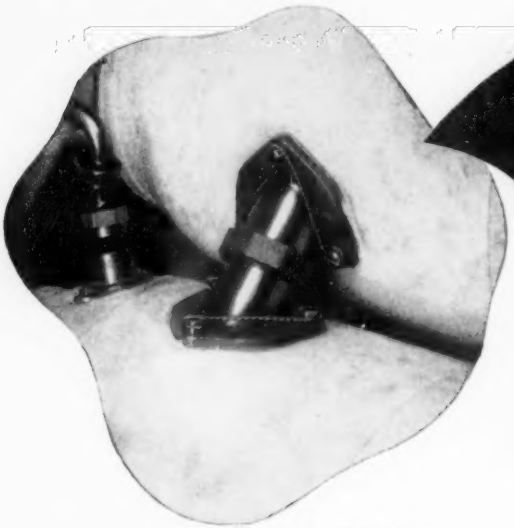
FERTILIZING FREIGHTER—Third Bristol Freighter ordered by the Royal New Zealand Air Force takes off from Filton, England, on its delivery flight. Plane is fitted with three 2-ton fertilizer hoppers for aerial top-dressing of hill pastures.



SIAMESED PIPER—This peculiar creation (above) is the handiwork of Harold Wagner, Portland, Ore. It's two Piper Cubs, with port prop shaft reworked for clearance with starboard prop. Wing span is 38½ ft.; top speed is 120 mph. Plane has racked up 30 hr. flight time.

Plane News In Pictures

WHITE TOPS FOR TRANS WORLD—First photo (right) of Lockheed's assembly line for TWA's Super Connies shows new production area necessitated by orders and size of craft. Planes receive major assemblies here, move to another line for interiors, instruments, radio and final check.



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dependability

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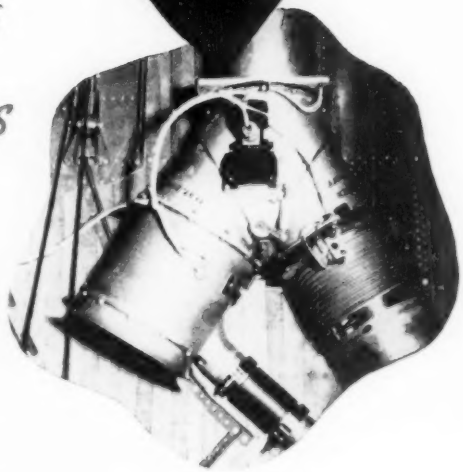

Whenever liquids and gases must be conveyed under conditions of vibration, misalignment, flexation or expansion and contraction, CMH REX-FLEX solves the problem. Fabricated from stainless steel, in a variety of forms, CMH REX-FLEX combines flexibility with the durability and temperature resistance of stainless steel. It is fabricated in a variety of forms and assemblies to meet the most exacting application requirements. Scientifically determined curvature of corrugations provides maximum resistance to fatigue to assure long, dependable life.

CMH REX-FLEX stainless steel bellows, flexible metal hose, ducting and flexible connectors are manufactured in a complete range of sizes to meet your specifications. For recommendations send an outline of your needs.

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Manufacturers of Convoluted and Corrugated Flexible Metal Hose in a Variety of Metals · Expansion Joints for Piping Systems · Stainless Steel and Brass Bellows · Flexible Metal Conduit and Armor · Assemblies of These Components
In Canada: Flexonics Corporation of Canada, Ltd., Brampton, Ontario

WHO'S WHERE

In the Front Office

O. M. Mosier, American Airlines' vice president, has been made responsible for direction and coordination of operations, maintenance, supply and engineering departments. **C. W. Jacobs**, vice president, will handle the duties formerly performed by Mosier, including coordination of AA's Mexican interests.

David F. Devine has been named vice president of the Arma Corp., Brooklyn, N. Y., electronics maker, and will head up the firm's financial division. Devine formerly was comptroller of Bell Aircraft Corp., Buffalo.

Victor E. Fletcher has been designated assistant to the president and assistant corporation secretary of Electrol, Inc., Kingston, N. Y. Newly named as vice presidents are: **Howard B. Smith**, sales manager; **Edmund D. Holland**, manager of development and engineering; **George D. Logan**, plant manager and **Rudolph Ratschitzky**, secretary-treasurer.

Changes

Martin V. Kiebert, Jr., has been appointed manager of a large government project undertaken by Bendix Aviation Corp. Kiebert's experience includes a thorough guided missiles background.

James G. Flynn, Jr., has been named director of the aviation and commercial sales division of Collins Radio Co., in addition to his post as manager of Collins' Dallas, Tex., manufacturing division.

J. C. Fetters has been designated chief engineer of power turbines for Allison division of General Motors. **G. E. Holbrook** has been made assistant chief engineer on production power turbines, and **J. B. Wheatley** is assistant chief engineer on development power turbine engines.

Paul E. Allen has been designated director of quality control for Beech Aircraft Corp.

Claude O. Witze, formerly industrial and public relations manager for Svorhton, Inc., has joined Piasecki Helicopter Corp. as director of public relations.

Ted C. Fisher has been promoted to assistant service manager of United Aircraft Service Corp., and **Frank C. MacTernan** has been named assistant West Coast representative. Both will handle Hamilton Standard products.

Edward O. Rodgers has been appointed director of public affairs division of the Air Transport Assn.

What They're Doing

Edward J. Foley, formerly eastern region manager for Gordon D. Brown & Associates in Washington, D. C., has opened an office at 9619 Glencrest, Kensington, Md., to act as resident liaison representative and engineering and sales consultant to industrial clients. His office phone is Oliver 3933. Foley has had extensive airlines experience.

INDUSTRY OBSERVER

► **Douglas Aircraft Co., notified by Air Force to tool its old World War II Chicago plant (until recently occupied by Fairchild) for production of the Douglas twin-jet engine light bomber RB-66 is also planning to set up a dual production line for its piston-engine Navy attack plane series AD-4, 5 and 6. Navy version of the RB-66, designated A3D, is just getting groomed for first flight tests at Edwards AFB. Scheduled by Navy to be in full production by December, 1953, for use aboard the new 57,000-ton USS Forrestal, firm decision as to location of A3D production has not been made, although the Chicago facility is probable site.**

► Glenn L. Martin Co., licensed by English Electric Co., to build the B-57A Canberra for U.S. tactical Air Force wings, continues beset by difficult engineering problems in connection with altering Canberra design to meet the needs of U. S. mass production methods. Latest advice is that test flight of first U. S. prototype will be delayed until mid-1953, with production just beginning at year-end, 1953. The plane is currently scheduled to be powered by two Wright-built, English-licensed Sapphire J65 jet engines.

► **Cessna Aircraft Co. plans to double production of its Model 170 by the end of 1952, as a result of mounting orders for the 1952 version with its new high-lift flap and redesigned control system. Necessary increased material allocations for the extra production have been approved in Washington, the company states.**

► U. S. aircraft manufacturers are asking the Munitions Board to set up an interservice project to standardize the model specifications format for all military aircraft used by services. Specifications are getting too complicated, with the Army, Marines and Coast Guard now getting into the act, along with Air Force and Navy air, and the manufacturers would like to explore the chances there might be of developing a standard spec format.

► **Canadian version of the North American F-86E weighs 16,500 lb., according to latest information. Powerplant is the General Electric J47GE-17 turbojet. While performance figures are cloaked in security, its service ceiling is reported as 53,000 ft. with a 57,000 ft. absolute ceiling. Tactical radius is reported as 535 mi.; cruising radius 1,250 mi.; and ferrying range 2,350 mi. The Royal Canadian Air Force has finished equipping one complete squadron with Canadair F-86E fighters and is due to outfit two others shortly. All three will form the No. 1 fighter wing which is scheduled to be located at North Luffenham, England.**

► Convair has received a $200,000 development contract from USAF to develop titanium alloy parts for jet pods. Although titanium has long been attractive as an aircraft material because of its high strength-to-weight ratio and its heat-resistant and corrosion-resistant properties, improved bulk refining processes are needed to make it available at lower cost. Currently, refined titanium sells for $20 a pound on the commercial market, Convair reports.

► **All Military Air Transport planes assigned to, or operated through, tropical areas are scheduled for a new paint job. Planes will be painted with a white solar-resistant lacquer on cabin roof exteriors. Tests have indicated that the lacquer coat reduces cabin interior temperature an average of eight degrees. The MATS aircraft will receive their new paint dress during factory contract cycle reconditioning throughout 1952.**

► Lockheed Aircraft recently hinted at something in an advertisement which said it was now developing aircraft using six different kinds of power, but named only four: reciprocating engines, turboprops, jets and rockets. If "jets" means the common garden variety of turbojet, chances are the unnamed prime movers will turn out to be ramjets, and possibly atomic power.

Washington Roundup

Gen. Vandenberg

USAF Chief of Staff Gen. Hoyt Vandenberg's reappointment will be okayed by the Senate Armed Services Committee and confirmed by the Senate. But it may mean a fight.

USAF SKELETONS?

How much USAF linen will be washed out in public first?

Republican Sen. Harry Cain of Washington, an Army reserve colonel and member of the Armed Services Committee, wants a thorough airing of the arguments, hitherto kept discreetly off the record, for various prospects for the top USAF post.

This is Cain's approach—which some think is spurred by supporters of Gen. Curtis LeMay still trying to maneuver him into the top post:

• President's reason for nominating Vandenberg to serve an additional 14 months is "about as meaningless and inconsequential as any reason I have ever heard."

(White House announced that "the President wants to make sure that Gen. Vandenberg has an opportunity to round out his full 30 years of military service as Chief of Staff. The President does not wish [him] to be in a subordinate command before he reaches retirement.")

• Congress intended four-year terms for Chiefs of Staff to encourage aspirations of lower echelon officers and also to benefit the services by duty of ex-chiefs in other posts.

Cain's comment: "What the President has suggested is that any future Chief of Staff, for any service, will serve in that capacity from the time he is first appointed until the officer retires for age."

• Is Vandenberg the only officer qualified for top USAF command?

Cain thinks not: "If our services do not possess many general officers who are prepared and qualified to become Chiefs of Staff at a moment's notice, then the nation faces the future without any real preparedness worthy of the name. But I am convinced that however able a particular Chief of Staff may be today, he can be replaced by any of a number of others who will bring only progress and improvement to the branch of his service."

• Should Vandenberg be detailed to SAC command? Cain hasn't said so, but he pointedly hints at it: "It is not proper, the world being what it is today, to refer to other echelons of the Air Force as being subordinate commands. It would not be possible, for example, to fill a more important assignment than that of commanding general of the Strategic Air Force."

POLITICAL DOG-FIGHT?

• The Vandenberg nomination could touch off a first-class political row with harmful repercussions on the military program.

Experienced Sen. Richard Russell, chairman of the Armed Service Committee who'll manage the Vandenberg confirmation, can be counted on to keep the matter on a high level within military bounds where it belongs.

But some developments indicate that it may be dragged into the political arena in this Presidential election year.

• State Department, chief target of pro-Taft Republicans, put an absolute veto on LeMay's appointment.

• And LeMay was the star military witness for the Taft supporters in last year's "great debate" over sending troops to Europe. LeMay's military position, with its advocacy of long-range bombing, fits into the isolationist-inclined political position.

• Sen. Robert Taft's public pronouncement that he "lacks confidence" in the present Joint Chiefs of Staff virtually makes his opposition to Vandenberg inescapable.

WILL THE WOUNDS HEAL?

Will a now-divided USAF pull together after the Vandenberg confirmation—or use its talents in brick throwing? That is the over-riding question.

▶ **The Background:** Secretary for Air Thomas Finletter and his lieutenants backed LeMay for Chief of Staff. With Finletter, removal of Vandenberg appears to have been a major motivation in his LeMay support.

• Secretary of Defense Robert Lovett decided, however, in favor of Vandenberg's reappointment—following State Department veto of LeMay. The President concurred.

• Three prospects for the top appointment seem to have bowed out gracefully. They are Gen. Nathan Twining, new SAC commander; Lt. Gen. Thomas D. White, deputy Chief of Staff, operations, and young Lt. Gen. Lauris Norstad, now with NATO in Europe.

• But the truce hasn't been signed between the Vandenberg and LeMay forces—which reach down into the aircraft industry, a sizeable segment of which took sides on the appointment. Latest indication of this: USAF public relations, under Brig. Gen. Sory Smith, was pulled out from Vandenberg and put under Finletter.

SENATORS SAY

This is how members of the Senate Armed Services Committee feel about the situation:

Sen. Richard Russell, chairman: "I am for Gen. Vandenberg. He's doing a good job. And I'll fight for his confirmation, if that should be necessary. I hope it won't."

Sen. Harry Byrd: "A very good appointment and a very good member of the Joint Chiefs of Staff. A man should not be condemned because of a White House statement concerning him."

Sen. Lester Hunt: "The reasons given for the President's reappointment should not be taken as the sole reasons for Vandenberg's reappointment. Obviously the President would not have reappointed him if he did not have the ability and leadership required for the post."

Sen. John Stennis: "I would prefer a full-term appointment. But the nominating power is the President's prerogative, and I expect to go along with this short-term appointment now that it's been made."

Sen. Styles Bridges, ranking Republican member: "I have always held Gen. Vandenberg in high esteem. His appointment, in view of the situation, was very logical."

Sen. Ralph Flanders: "Sen. Cain has raised interesting policy points. However, I can see the position of the President and I am in an opportunistic mood, too. The Air Force needs time to straighten itself out internally and I think this can be done better if Gen. Vandenberg stays on them by making a shift of appointment now."

Sen. Wayne Morse: "I am very glad that the President has reappointed Vandenberg as Chief of Staff. On the basis of his record he deserves the reappointment."

Sens. William Knowland, Leverett Saltonstall and Lyndon Johnson had no comment. Two remaining members of the committee—Sen. Estes Kefauver and Russell Long—were not available.

—Katherine Johnsen

AVIATION WEEK VOL. 56, NO. 11
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Storm Over Stretch-Out Brews in Congress

- **It started with individual protests; and now Senate committee has scheduled full-dress hearings.**
- **Star attractions will be Secretary Finletter and Gen. Vandenberg. Their testimony may not agree.**
- **Finletter thinks the program "adequate." Senators are hearing otherwise from industry and military.**

By Katherine Johnsen

Congress is getting increasingly restive over the Administration's stretch-out of the air power build-up.

An offensive for more aircraft faster started with individual protests against the stretch-out by a few members in both the House and Senate.

Now, the Senate Preparedness Committee, headed by Sen. Lyndon Johnson, is opening an "intensive investigation to determine the effects upon America's air power position of the recent decision to postpone from 1954 to 1955 the target date for full Air Force readiness"—143 wings manned with up-to-date aircraft.

"Last November," Johnson pointed out, "the committee reported that aircraft production was substantially behind the schedules necessary for the minimum level of strength considered safe by our strategic planners. Since that time, decisions have been made which will stretch out our air power mobilization for an additional year."

▶ **Varying Views**—Likelihood that the committee hearings would find Secretary for Air Thomas Finletter and USAF Chief of Staff Gen. Hoyt Vandenberg at odds on the stretch-out has heightened interest in Senator Johnson's investigation. Finletter has testified that he considers the program "adequate." But nothing has happened in the international situation to change the goals set by Vandenberg and other military leaders.

Committee investigators are now making "a thorough check on facts available from military officials and the aircraft industry." Formal hearings are set to start Mar. 31. They will be open to the public, unless security is involved.

But Washington generally doesn't seem anxious to stir from the business-as-usual mood into which it lapsed with the lull in activity in Korea and go all-out for air power.

• There's concern over the build-up of Communist air strength in the Korean theater. Future air policy for this area, it is understood, was a major subject of Vandenberg's recent conference with the President at Key West. (A reliable estimate is that Communist forces now have over 1,000 MiG-15s in the area, compared with about 125 F-86s for the U.S.)

• But the $22.4-billion USAF budget for the coming fiscal year, which starts July 1, is based on "peace" attrition in Korea and there has been no hint from the Pentagon that additional money will be requested to take care of greater losses there.

• Scarce materials, which could have been used for additional aircraft production, now are flowing into civilian industries.

▶ **Lacked Priorities**—Former USAF Deputy Chief of Staff Lt. Gen. K. B. Wolfe told a Senate committee: "The aircraft could have been built in the period (originally established) had we been given the priorities that we assumed we were entitled to and could get."

Three major aluminum producers—Aluminum Corp. of America, Reynolds Metals Co., and Kaiser Aluminum Co.—are recommending relaxation of government control on aluminum in order to open up civilian markets for their products.

S. S. Inch, Kaiser vice president, reported to a Senate committee: "We do know that today we cannot find holders of CMP tickets who wish to purchase our products and yet there are many independent fabricators and small businessmen who want to buy aluminum and cannot because they have no tickets."

David Reynolds, Reynolds vice president, asserted, with "current military requirements, all the signs point to an increasing supply of aluminum for civilian use each quarter as far ahead as we can see. . . . Everyone in the aluminum industry thinks the time has come for putting some knee-action in the controls."

▶ **Tool Slow-Down**—Military orders of some machine tool manufacturers are being canceled and the industry is showing hesitancy to expand—although shortage of machine tools is the stock reason given by the Administration to justify the scheduled aircraft production slow-down.

Sen. Blair Moody said, "It is a complete contradiction to say that jet engines are being held up because of lack of machine tools and we cannot, therefore, move forward with our aircraft program . . . and at the same time cancellations are coming in, so machine tool plants cannot be operating at capacity."

▶ **Holding Back**—Harold Boyer, head of Aircraft Production Board, is having to buck National Production Authority's Metalworking Equipment division, sympathetic to machine tool industry's reluctance to expand production.

Moody pointed out: "It is certainly very evident that a very, very important factor in this whole machine tool picture is the fact that the industry is scared to death it is going to run off the end of the dock in a few years."

Wolfe, now president of Oerlikon Corp., which plans to construct a machine tool plant in this country, testified in support of Boyer's position: "I would rather over-build machine tools and have them in excess than be limping along there with bottlenecks all the time."

▶ **Small Business**—But small business subcontractors are beginning to feel the repercussions of cutbacks in the military program and their proponents in Washington, who until now have been pressuring for release of materials for civilian production, are revising their outlook.

Moody, chairman of the Small Business Subcommittee on Procurement, asserted: "When something happens to one of these big military contractors, sometimes the subcontractor is hurt worse than the big company. The big company can absorb it while it may take the life of the small company. That is going to be our approach."

The Senate Preparedness Committee's investigation will cover these major points:

• Aircraft inventory at the time of the Korean war and deliveries of "fixable" aircraft since that date.

• Aircraft lost through enemy action

and aircraft lost through obsolescence since the outbreak of hostilities.

• U. S. aircraft production as compared to Soviet aircraft production.

(According to a reliable estimate, Russia produced 750 jet bombers and close to 6,000 MiG-15 or improved type jet fighters last year compared with U. S. production of 50 B-47's, expected to amount to 300 this year, and a "few hundred" F-86s.)

• Quantity and quality of aircraft now in production and future prospects.

• Operations of the current production program and steps that have been taken to break the bottlenecks.

AF Acquires Airport For Jet Test Base

Palmdale, Calif., Airport, in Los Angeles County, is being acquired by the Air Force for conversion to a major base for production testing jets.

AF officials say that when completed the facility will represent a total expenditure of $50 million. Commitments totaling $20 million have been made for final assembly and test facilities for three major aircraft companies—Lockheed, Northrop and North American.

Lockheed already has started operations at a new $400,000 hangar built on the base through agreement with county officials. Cost of this project will be absorbed by AF.

Palmdale, a former Air Force base, was selected for jet testing because of its isolation from populous areas. It is located in the Mojave Desert, 40 miles from Los Angeles. Air Materiel Command expects the new facilities to be in use within 18 months. At peak 3,000 persons will be employed.

How Good Is France's Mystere?

An MSA release boasting it beat F-86 in 'duel' is toned down considerably in Air Force interpretation.

What began as an enthusiastic press release by a Mutual Security Agency contract writer in France on the merits of the new Marcel Dassault jet fighter "Mystere" MD-452 has turned into a headache for the U. S. Air Force, North American Aviation, and Mutual Security Agency.

The MSA release, datelined Bordeaux, France, not only predicted a great future for the French fighter but declared that American test pilots found the plane "more maneuverable at high speeds than the F-86 and that the MD-452 gave a better showing at braking while landing."

The release was careful to say, however, that "in defense of the Sabre, officials point out that the Mystere is a much newer plane than the run-of-the-production-line Sabres used in the test."

▶ **Plane Duel**—Mutual Security Agency declared that the so-called test was in effect a "Mystere-Sabre duel, which took place in the sky high above Marignane, France, (and) involved two of America's greatest test pilots, Brig. Gen. Albert Boyd, now Vice Commanding General, Wright Air Development Center, Dayton, and Maj. Charles E. Yeager, the man who has flown faster than any other human being.

"For the first tests, the American pilots in their Sabres escorted the French ship which was piloted by 30-year-old Roger Carpentier, a hero of the Free French forces. Later, Yeager won the drawing of straws to become the first American to fly the Mystere. Under his and General Boyd's hands, the Mystere broke its own records and stole the performance show from the American Sabre jets."

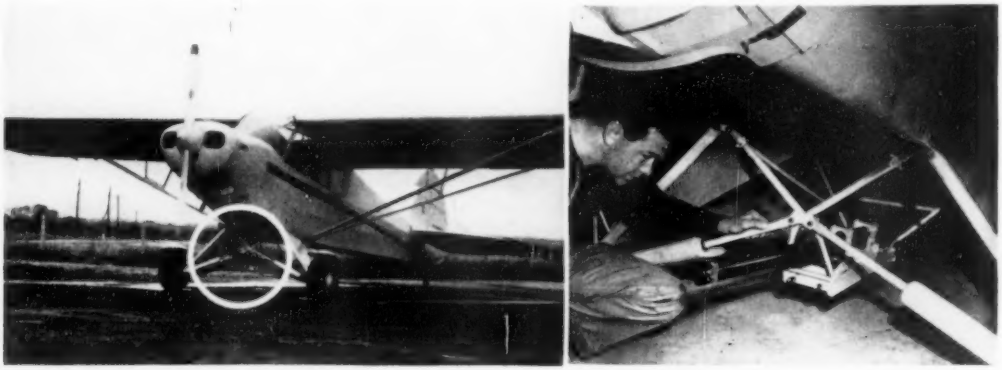
Air Force, put in the ticklish position of having to defend the reputation of its top current production jet fighter and at the same time not offend the dignity of another friendly nation's hottest jet product, agreed in part with the release which had been issued by the MSA.

▶ **Details Incorrect**—In an official statement, Air Force admitted in behalf of Brig. Gen. Al Boyd that he and Yeager had evaluated the French fighter for the French government and declared it "an excellent aircraft."

Boyd said, however, "that several details of an account received by the Mutual Security Agency concerning test flights made in the Mystere by himself and Yeager were incorrect."

Specifically, Boyd said, "Test of the Mystere did not include simulated combat and that no attempt was made to test the relative maneuverability of the Mystere and the USAF's F-86 Sabre jet."

According to the Air Force, two F-86 Sabre jets were used in the tests at Marignane, to check the accuracy of the air speed system of the MD-452 and to observe the French fighter in flight. Both Boyd and Yeager took turns flying the MD-452 while one or both of the



SUPER CUB SET FOR SHOOTING AND SHOUTING

This Piper Super Cub's versatility has been increased with installation of an automatic 12-round shotgun, fitted in the landing gear Vee (circle), and a public address system. The remote-controlled shotgun, detailed in photo, right, has proven very effective in knocking out eagles and coyotes, which prey on ranch animals; the loudspeaker system enables the rancher, Bob Masterson, Paducah, Tex., to direct cowhands in roundup operations and in locating strays. Loudspeaker horns are located under the wings near the outer struts. Sound and gun setup were installed by Jack Brink (shown) of Air News, Inc., San Antonio Municipal Airport.

F-86 fighters served as pacer and observer planes.

Besides checking the air speed system of the French fighter, the Air Force explained, the F-86s enabled the observers to check vibration, operation of control surfaces, and aerodynamic stability of the Mystere, and to detect any difficulties which the pilot could not observe from the test plane's cockpit.

►**No Comparisons**—An Air Force spokesman said that Boyd and Yeager had represented the Air Force at the request of the French government to evaluate the new fighter by American standards and that no test comparisons between the F-86 and MD 452 had been made either officially or unofficially.

The Air Force said that Gen. Boyd and Maj. Yeager, both convinced that the Mystere is an excellent interceptor, had recommended its production to the French air force.

The Mutual Security Agency said that assembly line production of the Mystere would begin in April, and that by the end of 1952, with the help of more than $5 million worth of U. S.-supplied machine tools the Dassault company would be producing about 30 jets a month.

The Mystere is now in limited production at the Bordeaux final assembly plant of Marcel Dassault Aircraft Co. As delivery of machine tooling from the United States is completed, manufacture of the MD 452 will be a joint project of six other French subcontractor aircraft manufacturers.

The plane, which is said to have a performance capability falling somewhere between that of the Republic F-84 and North American F-86, weighs approximately 12,500 lb. and is powered by a single Hispano-Suiza-built Nene developing 5,060 lb. thrust.

Army Plans to Fight For More Air Funds

Army aviation, which took one of the worst beatings in the whole 1953 defense budget from a decision reportedly made in Secretary of Defense Robert Lovett's office, is going to put up a fight.

Joint Chiefs of Staff had approved a program to increase evacuation and cargo helicopters per Army division—after the notable performance of Army aviation in Korea.

Army aviation estimated the cost of the approved step-up at $241 million for the coming 1953 fiscal year.

When the winds of economy blew over Washington, though, they expected only the usual 10 to 15% cutback. Instead, the $241 million was trimmed to $36 million—and Army is still wondering why.

More Comets

- **Short Bros. to build jet carriers for de Havilland.**
- **D-H now has orders for 45 Comets, more in sight.**

(McGraw-Hill World News)

London—In a move to step up delivery dates and thereby take greater advantage of potential orders, de Havilland Aircraft Co., Ltd. has subcontracted production of the Comet to Short Bros. & Harland of Belfast.

Short's, it is hoped, will have its first Series II Comet (Avon-powered) off the production line in 1954. Before that, D-H hopes to get parts subcontracted in Belfast for Hatfield production.

D-H right now has 45 orders for Comets on its books, with another five or so in the making. But some airlines, specifically Sabena and KLM, have balked at the idea of ordering Comets due to uncertain delivery dates. Sabena and KLM figure the U. S. may be in the jet transport business with a better offer by the time D-H can deliver Comets to Belgium and Holland. The present arrangement is designed to ease this threat to Britain's up-and-coming foreign exchange earner.

►**Better Labor Market**—Short Bros., which was expropriated by the government during the war and is today Britain's one state-owned aircraft manufacturer, offers an easier labor market in Belfast than D-H has at Hatfield. The deal points up the fact that the British government is giving production of civil jet and turboprop types as high a priority as most military types today. Reason: the earning potential of Britain's jet transport abroad looks like a very welcome help for Britain's chronic balance of payments difficulties.

Seven Comets are now flying, including one Series II (Avon) type. Comet number eight is expected to fly in a week or two. Comet No. 20 has made its appearance on the production floor at Hatfield. Series I (Ghost-powered) Comets have been coming off the line at the rate of about one a month.

BOAC has taken delivery of one Comet and will take delivery of two more within the next couple of weeks. A fourth Comet is on loan to BOAC now, but will be returned to Hatfield shortly for refinements.

BOAC will introduce the Comet on its London-Johannesburg run in May.

Bankers

Three retired generals and an active admiral have pooled their resources with several other men and have established the first National Bank of Arlington, Va.

The officers:

Gen. Carl Spaatz, ret., former Chief of Staff, USAF.

Maj. Gen. Howard C. Davidson, USAF ret.

Gen. Jacob L. Devers, USA ret., former Chief of the Army Field Forces.

Adm. Burton B. Biggs, former petroleum expert for the Munitions Board and now on active fleet duty in the Pacific.

AIA Urges Changes In Patent Proposal

Aircraft Industries Assn. has told the House Judiciary Committee that the proposed Peacetime Royalty Adjustment Bill pending in Congress would give government agencies authority to decide validity of patents, thus usurping powers now vested in federal courts.

An AIA spokesman urged that three provisions be incorporated in the bill as safeguards if the measure is to be considered:

- A standard minimum royalty payment should be established for guidance of government administrators.
- Power to reduce royalties should be confined to the military services.
- If royalties are reduced, patent owners should not be subject to further reduction by renegotiation at some later date.

Atom-Power Airframe Contract to Boeing

A second contract for "engineering study of the application of nuclear powerplants to aircraft" has been awarded to the Boeing Airplane Co. by the Air Force.

The Boeing contract is concerned with developing an airframe for the Pratt & Whitney atomic engine development for which P&W was awarded a contract by Air Force last year.

An earlier AF contract was given to Consolidated Vultee Aircraft Corp. for development of an airframe for the General Electric Co. atomic engine development.

Air Force said that no details as to scope of either program, or as to specifications of the powerplants under study could be revealed.

Get in the Scrap—Turn Yours in for Defense

USAF CHIEF OF STAFF Hoyt S. Vandenberg is seen here with an important part of the nation's air power leaders on a recent visit to Douglas Aircraft Co.'s Santa Monica plant. Left to right, Donald W. Douglas, J. H. Kindelberger, North American Aviation, Inc.; Lt. Gen. Edwin W. Rawlings, AMC; Gen. Vandenberg; Lt. Gen. Earle E. Partridge, ARDC; Oliver P. Echols, Northrop Aircraft, Inc.; Maj. Gen. William M. Morgan, Western Air Procurement District; and Robert E. Gross, Lockheed Aircraft Corp.

Vandenberg, Truman Talk Korea

Air Force Chief of Staff Hoyt Vandenberg visited President Truman at his Florida vacation headquarters last week to give the President a first hand account on the Korean air situation and then left on a tour of major USAF installations on a "routine inspection of facilities."

Following the Presidential briefing, Vandenberg flew to Eighth Air Force Headquarters in Ft. Worth to confer with Strategic Air Command officials at that base. During his visit in Ft. Worth, Vandenberg was guest of Consolidated Vultee Aircraft officials on a tour of that company's Ft. Worth facility just across the field from 8th Air Force headquarters.

The Ft. Worth visit gave rise to speculation that B-36 bombers might be involved in a new Korean theater move. Official Air Force sources denied that possibility entirely and added that it was entirely possible that the "Chief" wanted to take a look at the YB-60 swept-wing version of the B-36 still under security wraps at Convair's Ft. Worth plant.

While exact details of the Vandenberg-Truman meeting are not known, Air Force sources said that Truman has been particularly concerned with reports of massing Red China air strength in the Korean theater (now said to be over 1,400 aircraft including 1,000 which have been formulated jet fighters) and of Air Force plans for meeting that threat.

AMC Again Posts Late Mail Low Bids

Dayton, O.—Air Materiel Command again is posting information on late bids, following a brief discontinuance of the practice.

Brig. Gen. Phillips W. Smith, chief of the procurement division, announced the new decision after studying protests by the National Association of Manufacturers' Representatives (NAMR).

Bids on formally advertised procurements are read at public openings designated on invitations. Frequently, however, legitimate bids are not received in time to be read at the openings. This generally results from delayed air mail service due to bad flying weather and delays within the mail and distribution system at Wright-Patterson AFB.

When it is determined by postmarks that the bid would have been received in advance of the opening under normal conditions, it is classified as an admissable late bid. The previous practice was to post the identity of the bidder and his unit prices in the Contractors Relations office at the base within a few days after the opening.

It is the practice among many bidders to hand carry bids to the openings. Thus, the bidder or an official in his organization could determine whether his bid was low among those read at the opening. It also is the practice to remain in Dayton until late bids are posted to be sure that he can go ahead and make commitments on materials and, in some cases, facilities.

Many small business firms also used the posted information as a base for contacting contractors, particularly low bidders on an individual procurement, as a source of subcontract business.

The decision not to post admissable late bids left the low bidder at the opening in a quandary. He would have no way of knowing if, first, there were any late bids and, second, if any of the bids were lower than his.

The new AMC announcement indicated admissable late bids will be posted 72 hours after the bid opening—thus affording interested bidders complete information on each advertised procurement.

Army Pilots Sold on Rotor Rescue Craft

Helicopters stand up even under the most rugged conditions in actual combat, testifies an Army rotary-wing pilot, 1st. Lt. Joseph Bowler, who has returned to this country after flying 482 missions evacuating over 800 wounded in Korea. And pilots are sold on the rescue capabilities of the rotorcraft.

Supposedly "delicate" sections, such as the transmissions and rotor heads, take it all right, but lack of proper fuels plays havoc with the engines. The Bell H-13Ds (47-D1) Lt. Bowler flew had to have a complete engine change about every 160-170 hours, in contrast with 500 hours or more back in on the copter while it is sitting in the open.

▶**Strip for Action**—For combat, pilots strip their copters of all possible equipment to get maximum speed and payload—on the H-13D for instance, they ditch the auxiliary wheels fitted to the skid landing gear and pull out all the radio except for a seven-channel VHF set.

There's a great need to educate the ground troops in preparing evacuation cases, so that the patients can be loaded as quickly as possible and the pilot can get out of the area. Much of the evacuating is done under enemy fire and even three minutes on the ground is sufficient for the opposition to zero in on the copter sitting in the open.

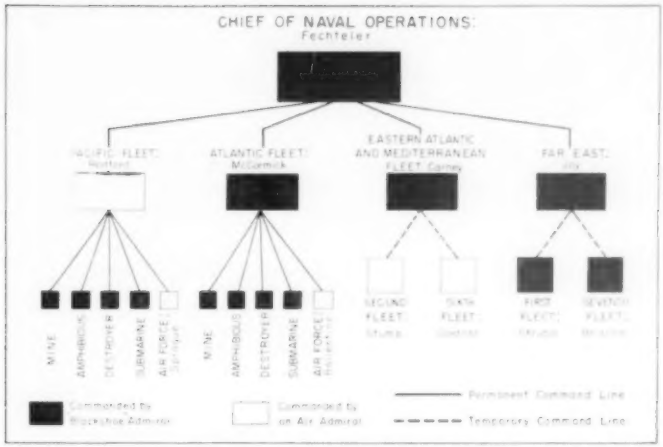
Pilots have become skilled at improvising equipment on the spot to improve the lot of the wounded. For instance they devised a system, picking up exhaust pipe heat, to keep the litter patients warm during flights. Then they installed brackets on the side of the cabin to hold plasma bottles, so that critically wounded men could get transfusions on the way to the aid station.

New Gas Tax Seen

The Administration will recommend legislation in the near future providing a system of assessment of users to finance the cost of operation of the federal airways, E. B. Lee, Deputy Civil Aeronautics Administrator, has told the House Appropriations Committee.

The prospect is that a surtax on aviation gas will be proposed.

Get in the Scrap—Turn Yours in for Defense



NAVAL operations are held firmly in the hands of surface admirals, with only one fleet, the Pacific, commanded by an airman, as shown in the diagram.

'Blackshoes' Control Navy Air

- **And airmen who don't like it can't talk.**
- **But a retired admiral asks Congress to act.**

There are rumblings of an intra-Navy war between the "blackshoe" surface admirals and airmen.

Although the Navy advertises itself as an "Air Navy" and acclaims the aircraft carrier as the "backbone" of the Navy, the fact is that the surface admirals now command 90% of the top fleet posts.

Naval airmen don't like it. And they're apprehensive over the prospect that the major shuffle of admirals, scheduled for June, will result in an even greater control of the fleets by surface men.

Navy's Chief of Operations, Adm. William Fechteler, is an old-line battleship admiral. And he's the man who'll have absolute say on the re-assignment of admirals. Although he now pays verbal tribute to the role of aviation in naval strategy, the record stands that he was a participant with the surface group that urged Congress to place a ceiling of 3,000 on the number of aircraft in the Navy to hold down Naval air before World War II.

▶ **Anti-Air Men**—World War II sunk the battleship as a major factor in warfare—and, along with it, the battleship admirals were submerged in the naval organization. But they've arisen again, largely because of these two factors:

• **Able, but overly-partisan.** Vice Adm. Arthur Radford's ill-fated attack on the Air Force and strategic bombing, publicized in the B-36 investigation, put Naval air in the political doghouse and virtually ruled out an aggressive naval aviator for Navy's top command.

• **Prospect of surface ships,** armed with guided missiles, supplanting the carrier and piloted planes has spurred a new aggressiveness on the part of surface admirals, among them Adm. Fechteler, who enthusiastically looks to the missile as a perfection over the piloted plane.

Although the major shuffle of admirals won't be announced until June, there already are these developments that have stirred Navy airmen:

• **A widespread report** that four-star Adm. Radford will be shelved away in the three-star post of superintendent of the Naval Academy. After his service in sea duty as commander of the Pacific Fleet, Radford is in line for administrative duty under Naval policy. But Air Force, which marks him as the "master-mind" of the B-36 investigation, would vigorously oppose his placement in any policy-making post at the Pentagon.

• **Vice Adm. Thomas Sprague,** in command of the air arm of the Pacific Fleet under Radford, has announced he'll retire—after receiving word that he was to be demoted to two-star rank as commander of the Naval Air Technical Training Command at Memphis. In announcing his retirement plans, Sprague protested it had nothing to do with Navy's plans to demote him.

▶ **The Other View**—But some Naval airmen think otherwise: they view it as a play by the surface admirals to prevent an airman from rising to a top Naval command position. Sprague, 57, can't receive retirement pay unless he can put up a good case for it to Secretary of Defense Robert Lovett. Legislation passed last year prohibits retirement pay to officers leaving the service before the retirement age of 62, unless specifically approved by the Secretary.

• Although air warfare has been the dominant role of Navy in the Korean picture, a surface admiral, Vice Adm. Robert Briscoe, is going to supplant Vice Adm. Harold Martin, an air admiral, in command of the Seventh Fleet in conducting operations in this active area.

Naval airmen, anxiously viewing these signs of what's to come—in June—can't talk out.

But a retired air admiral is talking. He's Adm. Frederick Sherman, commander of the Lexington in the Battle of the Coral Sea and one of the brilliant tacticians of World War II, urging Congress to pass legislation requiring that the Chief of Naval Operations and the commanders of the Navy's fleets be airmen. Only one now is—Radford.

▶ **The Precedent**—It took legislation to get Navy to put airmen in command of aircraft carriers, Sherman points out. And a legal requirement that today's global "Air Navy" be commanded by aviators, he observes, "would not be too precedent-shattering."

Four-star Adm. Sherman's comment: "When the Japanese attacked our fleet in Pearl Harbor ten years ago, the completeness of the surprise was undoubtedly achieved, in part at least, by the fact that our top commanders of the day were inclined to discount both the probability of an attack by carrier aircraft and the destruction it could accomplish if made. This in spite of the fact our top aviators had

Definitions

Blackshoes. During World War II airmen were permitted to wear brown shoes to go with their wartime forest green uniforms. The surface Navy, however, was restricted to conventional black shoes. Intra-service, airmen were called "brownshoes" and surface Navy officers were known as "blackshoes." "Brownshoes" did not stick for airmen since the uniform was authorized for only a short time. But "blackshoe" stuck with the surface Navy. Thus, "blackshoe" admirals are surface admirals.

Air Admiral. An admiral who is a pilot and trained in flying techniques.

warned the fleet commander of the danger of such a raid and our carriers had made such attacks in practice exercises on numerous occasions.

"In the war that followed in the Pacific, it was demonstrated that control of the sea was dominated by carrier aircraft. There developed a strong feeling that the top Naval commands should be held by Naval aviators.

"Due to the fact that most of the aviator admirals were younger and junior to the non-aviator flag officers, all that this pressure could accomplish was the adoption of a policy that carrier task forces would be commanded by aviators and that other fleet commanders, if not aviators, would be required to have an aviator as chief of staff.

"On the other hand, aviator flag officers, even if commanding a carrier task force, were required to have a non-aviator chief of staff or deputy. This policy left most of the top Naval commands in the hands of non-aviators.

"And today, six years after the war, with aviation of even more importance, we find the highest Navy jobs . . . occupied by non-aviators."

CAA Requests More Funds for Personnel

Out of hundreds of government offices that had ceilings put on their expenditures for personnel this year, Civil Aeronautics Administration is one of the few that has run into trouble and is now requesting a lifting of the ceiling.

The aim of the provisions is to hold down mushrooming government employment and the political influence that goes with job giving.

CAA was appropriated $22.5 million for the establishment of air navigation facilities this year. But it was stipulated that not more than $4,965,300 be spent on personnel. In Mid-February, CAA suddenly discovered that this amount wasn't going to last until the end of the fiscal year, July 1, and furloughed some 200 employes.

▶**CAA Publicity**—Now CAA wants Congress to lift the ceiling to $5,950,000 and House Appropriations Committee has approved on the basis of CAA's report that this will save the government money.

CAA paved the way for favorable congressional action with publicity to the effect that some 75 navigational aids will remain idle throughout the country if the ceiling is not lifted.

This is the explanation given the House Committee by Deputy Administrator F. B. Lee:

• CAA's Washington office assigns projects to regional offices and leaves it up to the regional office to decide whether work be performed by CAA personnel, under contract, or by force account (under which CAA must furnish contractors with personnel). Force account workers, as well as CAA personnel, are paid out of CAA's allocation for personnel.

Lee said: "The Air Navigation Facilities program traditionally has been administered to obtain the best results for the least cost. Consequently under the decentralized program execution policy now in effect, projects are assigned to the regions and the regional officials are charged with the responsibility of utilizing the most economical and satisfactory method of accomplishing these projects. In this, they may use force account, contract service, and/or the employment of regular personnel to accomplish the program on the most economical basis without detailed control by the Washington office."

• Since the Washington office doesn't know how much work regional offices do by contract, it is not in a position to know how expenditures for personnel are going.

Lee said: "Unless the CAA departs from this policy (of giving regional offices discretion to accomplish projects either under contract or by regular CAA personnel), it will not be possible to accurately forecast personal service fund requirements, since the requirements will vary with the number of projects accomplished under contract."

• Nevertheless, CAA has developed "drastic changes in the administrative control of the program."

• Before asking for the lifting of the personnel ceiling, CAA considered doing more work by contract. But, Lee said: "It is the opinion of the agency that such action would materially increase the cost of the projects, even if it were possible to arrange contracts in all locations."

• Unless the personnel ceiling is raised "We will have to go through a considerable reduction in force and pay terminal leave for employes who will be separated which will result in expenses to the government without productive labor in the amount of $186,000."

AA Asks CAB to Up Fares $1 Per Ticket

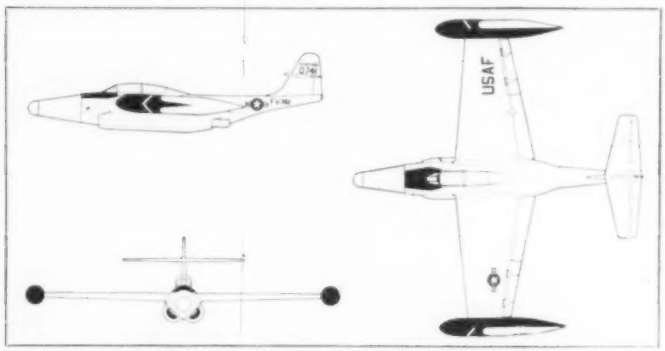
American Airlines has notified the industry that it will file an application asking CAB permission to charge an extra dollar for every ticket sold and to suspend roundtrip discounts, effective Apr. 15.

Washington observers report that CAB does not favor a fare increase now. However, they see the American move as the first alert aimed at nudging the Board toward quick action later, if costs continue rising.

One indication of CAB determination to hold fares down is the recent suspension of a Western Air Lines fare increase to 7 cents a mile on non-competitive routes to smaller towns.

Officials of CAB Rates division hint that the American Airlines rally for higher fares is not likely to shake CAB resolve to hold fares down.

Despite the rise in costs, a CAB official said, the airlines have not demonstrated that they aren't earning a fair return on investment. And earnings of up to 15% last year are a cushion against temporary pinches now, he said.



NORTHROP F-89D SCORPION DETAILS

Characteristics of the Scorpion two-seat all-weather fighter are shown in this three-view recently released by the Dept. of Defense. The Scorpion may be spotted from almost any angle by the mounting of its two jet engines against the underbelly, the noticeable taper of the fuselage aft of the wings, its high-mounted tailplane, the long, tapered nose. Other noticeable features are its mid-wing design and almost equal front and rear taper of the broad wings. Span 56 ft. 2 in., length 53 ft. 4 in., height 17 ft. 7 in. Top speed is over 600 mph. Armament is six 20-mm. cannon which are located in nose. The F-89-D carries rockets in wingtip containers.

NACA Probes Into Tandem-Rotor Control

- **Lab draws a 'horsecollar' in its copter research.**
- **But this may point way to directional stability.**

By David A. Anderton

A "horsecollar" is helping to solve one of the stability problems of a twin-rotor helicopter flown by pilots of the NACA's flight research division.

Placed round the forward fuselage of a Piasecki HRP-1 copter on loan to the National Advisory Committee for Aeronautics, the "horsecollar" increases the static stability of the copter in yaw. Actually the collar is a metal strip which acts as a spoiler and makes turbulent the flow along the fuselage. And it's a typical test "fix"—it was created to solve one special problem, regardless of the other effects it might have.

Use of the collar is just one phase of a series of flight tests now being made by the NACA's Langley Laboratory. The overall program is helicopter research; specific aim of the current group of tests is the development of handling quality requirements for tandem-rotor helicopters.

HORSECOLLAR is metal spoiler strip to create turbulent flow along HRP fuselage for increased directional stability. Temporary boom on nose carries devices to measured airspeed, angle of attack and sideslip angle. Copter is being flown by NACA pilots.

▶ **Single-Rotor Base**—Current U.S. Navy requirements for flying qualities of rotary-wing craft were established two years ago with the assistance of the NACA. They were based mostly on studies of single-rotor craft such as the Bell and Sikorsky copters.

Now the problem is to see if the characteristics apply to a tandem-rotor configuration. If they don't, it will be the task of NACA to recommend new or modified standards which will be applicable.

The Piasecki "Flying Banana"—the workhorse for the NACA flights—was loaned by the Bureau of Aeronautics. This was not to single out the craft, but to use it as an example of current practice in tandem-rotor design. Test data from the flights is hoped to be useful and applicable for any tandem copter, an incidental bit of knowledge may be an appraisal of the specific qualities of the Piasecki design.

(One characteristic which has been noted already: the HRP-1 has insufficient directional stability—hence, the horsecollar.)

▶ **Large Effort**—The rapid expansion of the helicopter industry from a base of empirical design, coupled with the combat-proven versatility of the windmills, has led to tremendous research effort on the part of the services and manufacturers. As one example of the magnitude of that effort, the full-scale windtunnel at Langley devotes one-third of its test hours to studies of helicopter configurations.

Langley has been in the rotary-wing research business for over 20 years. They started with flight tests of a fixed-wing autogyro and have been actively engaged in rotary-wing work ever since that time.

Even before flight testing of helicopters began, NACA published analytical performance studies of rotor systems.

In the summer of 1944 a single-rotor Sikorsky R-4 started the first helicopter flight test program at the NACA. Three years later, specific studies of performance stability and control were underway.

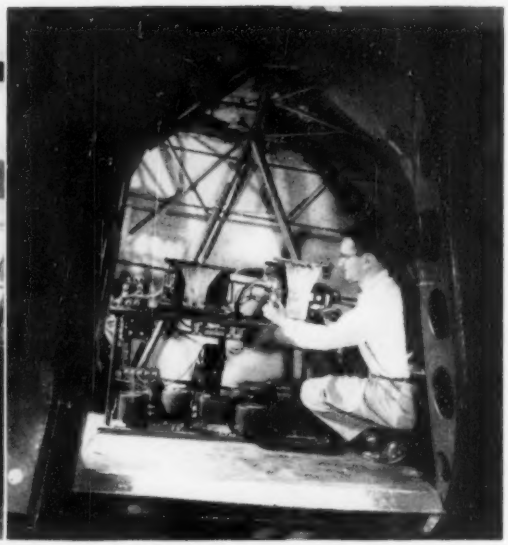
Other branches of NACA beside flight research and the windtunnel groups get into the rotorcraft act. There is a large outdoor helicopter tower where full-scale jet and conventional systems may be tested. And research is also contributed by the vibration and flutter branch, structures lab and free-flight tunnel.

▶ **Instrumentation**—The current tests of the HRP meant lots of instrumentation. A large volume of the roomy fuselage has been filled with recording instruments. These give a continuous time history of accelerations, velocities around stability axes and control positions.

Since the Piasecki job arrived at Langley, it has been flown by John P. Reeder and James B. Whitten, both NACA research pilots. First job they did was to study the longitudinal characteristics of the HRP—how it behaved with the nose above and below the horizon.

Basic reason for this study was what is known as longitudinal divergence. That means that if the aircraft is flying along straight and level, a small nose-up

HRP AND PILOTS Jack Reeder (in cockpit) and Jim Whitten about to take off on one of a series of flight tests on tandem-rotor configurations at the Langley Laboratory.



INSTRUMENTS for measuring and recording flight data are installed in rear fuselage of Piasecki copter. Kenneth Amer, NACA engineer, checks automatic instrumentation.

or nose-down variation from the flight path should not cause the craft to rise or fall sharply away from straight and level.

The way you make such a study is to fly the copter under different conditions of power and center of gravity position. After you establish steady flight, you make a sudden pull-up. If it balloons up beyond your worst hopes, you have longitudinal divergence, at least in one form.

Of course you have to compare the pilots' opinions with the recorded data; and when the NACA did that, it was found that the HRP was a typical tandem-rotor copter. The stability was reduced—or divergence increased—as power was increased and as the center of gravity moved aft.

► **Tandem Unique**—Placing one rotor behind the other creates novel flow problems. In forward flight, flow passes through the influence of the first rotor before reaching the second. The front rotor increases the downwash angle and increases the rotor inflow. Thus the aft rotor is working with reduced lift curve slope (because of the increased downwash) and nearer to the tip stall (because of increased inflow). Both these factors reduce the longitudinal stability of the copter.

But stability can be improved with this configuration. All you do is position the center of gravity forward.

Another study now in progress is the determination of how much static directional stability is necessary. (Directional stability is measured around a vertical axis through the aircraft CG and in a sense indicates the right and left steering case of the craft.)

The tandem rotor arrangement generally has low directional stability due to the high moment of inertia in yaw.

► **Control Springs**—In flight, inadvertent motions of the controls plus their interaction are impossible to prevent. But for flight tests, it is really necessary to maintain fixed control positions, frequently at the neutral position of the control. So spring devices were installed to help the pilots center and hold the controls.

In any evaluation of handling requirements, there is necessarily much dependence on pilot opinion. And if the range covered is limited, there is a chance that the pilots' comments will be affected. So generally the attempt is to cover stability, for example, from a condition where the aircraft is so stable it can hardly be controlled to a state where it is nearly catastrophically unstable.

In these copter tests, several methods were used to vary the directional stability over a large amount. Different power settings were used, because the directional stability varied directly with power. Incidentally, although added power improves the directional stability, it reduces the longitudinal.

► **Human Autopilot**—In one test method, the co-pilot was used as a human autopilot in an attempt to obtain the equivalent of a further increase in directional stability. For this different approach, the co-pilot read an indicator which told him the amount of sideslip angle. When he muddered to reduce the sideslip, it fed an opposing signal into the indicator and showed the reduction. The co-pilot's job then was to keep the indicator reading zero, which meant that there was zero sideslip.

When the pilot was ready to perform a typical test roll maneuver, such as abruptly deflecting and holding the lateral control, he took his own feet from the pedals. The co-pilot then attempted to keep the sideslip zero.

But it was at best only an attempt. Variations in sideslip were so rapid that the co-pilot could only keep the indicator needle centered for short periods of time.

Then came the "horsecollar." In windtunnel tests of a fuselage model, spoiler strips on the nose increased directional stability. The spoiler, a metal strip which projected about four inches outside the fuselage contour, created turbulence along the fuselage from the spoiler aft.

So on to the HRP went the horsecollar, and it definitely increased the static directional stability. It also definitely increased the drag.

► **Still More Problems**—The tandem configuration aggravates another problem, that of dynamic lateral-directional stability. In recent years, NACA has studied that stability problem for airplanes, and has discovered that stability-equation terms which were previously disregarded actually have important effects on Dutch-roll stability under

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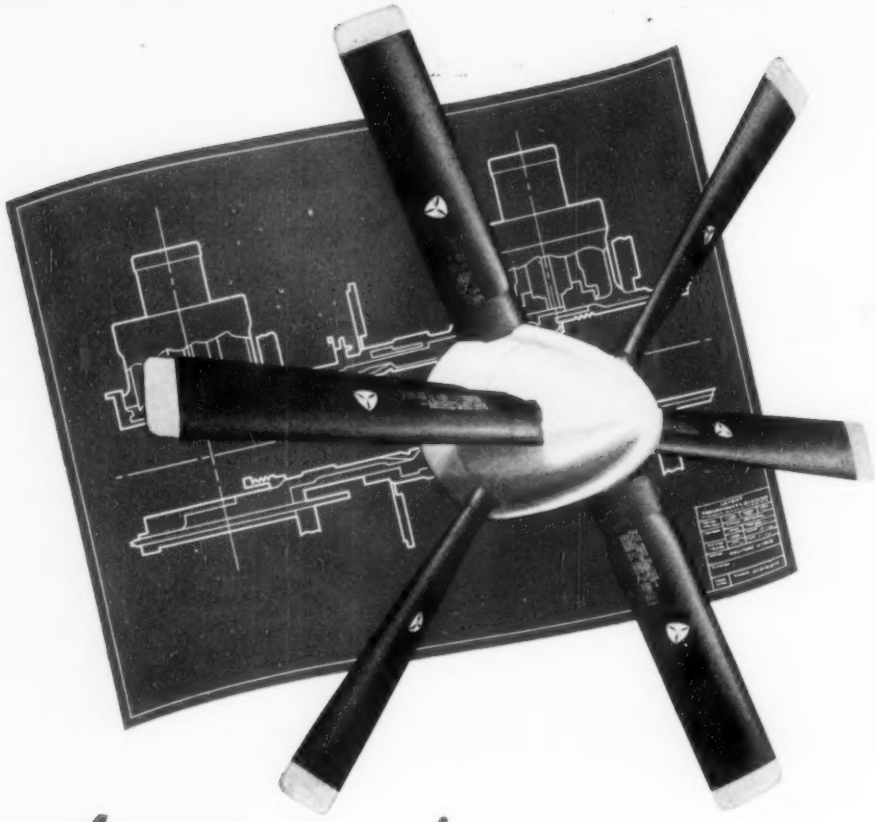

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certain conditions. You get these conditions when the flight path and airplane principal axis do not coincide, and when the moment of inertia in yaw is high compared to the moment of inertia in roll.

The helicopter in powered forward flight inherently has its principal axis tilted down with respect to the flight path.

This condition is where the neglected terms (product-of-inertia terms) are most destabilizing. And the tandem copter aggravates this because its moment of inertia in yaw is high, and in roll, it's low.

Both of these flight factors tend to create Dutch-roll instability. (Dutch-roll, although best described with the hands, is a combination of yaw and roll. The airplane swings to the right and rolls a little to the right, then falls out and crosses the flight path to swing and roll a little to the left. The process is repeated at a fairly slow rate, on the order of one cycle per second.)

▶ **Safety Dividend**—All this NACA research is aimed at the development capabilities of the copter. Under the direction of Melvin N. Gough, chief of the flight research division, and Frederic B. Gustafson, NACA's top specialist in rotary-wing design, these flight investigations should lead to extended usefulness of the copter.

These stability and control tests will make the rotary-wing craft safer and easier to fly over an increasingly broad range of conditions. And continued research will enable the helicopter to realize its full potentialities as an all-weather aircraft.

Missile Spin Force Measured on Model

Forces due to the spinning of a missile are now being measured on a rotating model in the Naval Ordnance Lab's supersonic tunnel, White Oak, Md.

The spinning model is powered by a tiny, frequency-controlled electric motor, designed and built specifically for the purpose by General Electric Co.

In the past, data for rotating projectiles have been determined from tests of fixed models, corrected for rotation by certain assumptions. This method is, of course, not as satisfactory as direct measurements, since correlation of model and free-flight tests is difficult.

Currently, NOL is using the spin models to check the effects of centrifugal force on the boundary layer which influences both skin friction and base pressure drag. Studies have been made for Mach numbers between 2.5 and 4.5.

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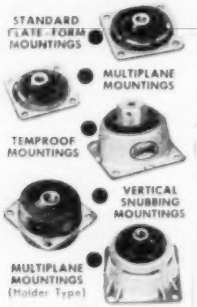

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AF Develops Safer, Lighter Parachute

A new personnel parachute, featuring automatic opening, low opening shock and reduced oscillation, has been developed by the Air Research and Development Command's Wright Air Development Center, Dayton, Ohio.

Currently undergoing jump tests by AF personnel at WADC's El Centro, Calif., Parachute Development Test Group, the chute will probably become standard for the Air Force.

► **Guide Surfaces**—Diameter of the chute canopy is 28 ft. Twelve triangular guide surfaces extend downward from the interior surface of the canopy. Purpose of these surfaces is to reduce oscillation and to lower opening shock.

There are two advantages gained by lowering the opening shock. First, there is less chance of injuring the chutist when the canopy pops; second, since opening loads are reduced, the chute itself can be lighter because of the reduced strength requirement.

And reducing the oscillation also decreases the jumper's chances of injury caused by his being swung into the ground.

The chute assembly weighs 22 lb., which, says the AF, is more than 20% weight saving over present parachutes. Part of this weight reduction comes from the substitution of cords for the metal stiffeners which had been used to give contour to the pack.

Automatic-opening equipment can be preset for operation at a specific altitude or after a specified time delay. The chute can also be opened manually in the usual way.

The harness has also been simplified; it now resembles—and is put on like—a vest. There are only three ad-

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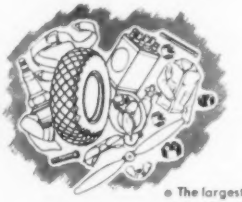

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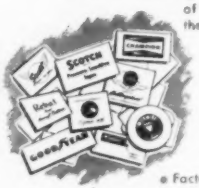

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justments to make instead of the seven now current practice.

This chute is the result of an eight-month development program at WADC and El Centro.

British Push Work On Plastic Delta

The all-plastic molded wing developed by British scientists will go on display at the British Industries Fair this spring. First shown at the 1951 Society of British Aircraft Constructors flying display at Farnborough, the wing is actually a prototype panel for the Fairey F.D.1.

Coincident with the announcement of the BIF showing, the British have released much more data on the design and construction than were available at the time of the Farnborough show (AVIATION WEEK Nov. 19, p. 23).

► **Claimed Cheaper**—The British claim that the technique involved eliminates the two biggest cost factors in plastic production—steel dies and high-pressure hydraulic machinery.

Basic material is asbestos fiber bonded by a resin; large, soft sheets that resemble felt are the result. Alternative materials for experimentation were fibers of cellulose, paper and glass.

One molding technique is very simple; the sheets are saturated with warm water and rolled by hand over a wood or plaster shape. The resin is added to lock the fibers in position, and the whole works is cured in an oven.

For more complete structures, the rubber-bag process is used.

The complete wing is made in two sections in order to get a glass-smooth skin. The sheets of asbestos felt which form the outer surface are separated from those forming the inner surface by layers of glass cloth and cellophane. After the first molding operation, this outer layer is peeled off and attachment bolts and rivets are inserted in the proper locations on the inner layer.

The outer skin is replaced and further molded which seals the skin flat on top of bolts and rivet heads.

Final finishing is by sanding; the wing is coated with a filler resin and then polished to a high gloss.

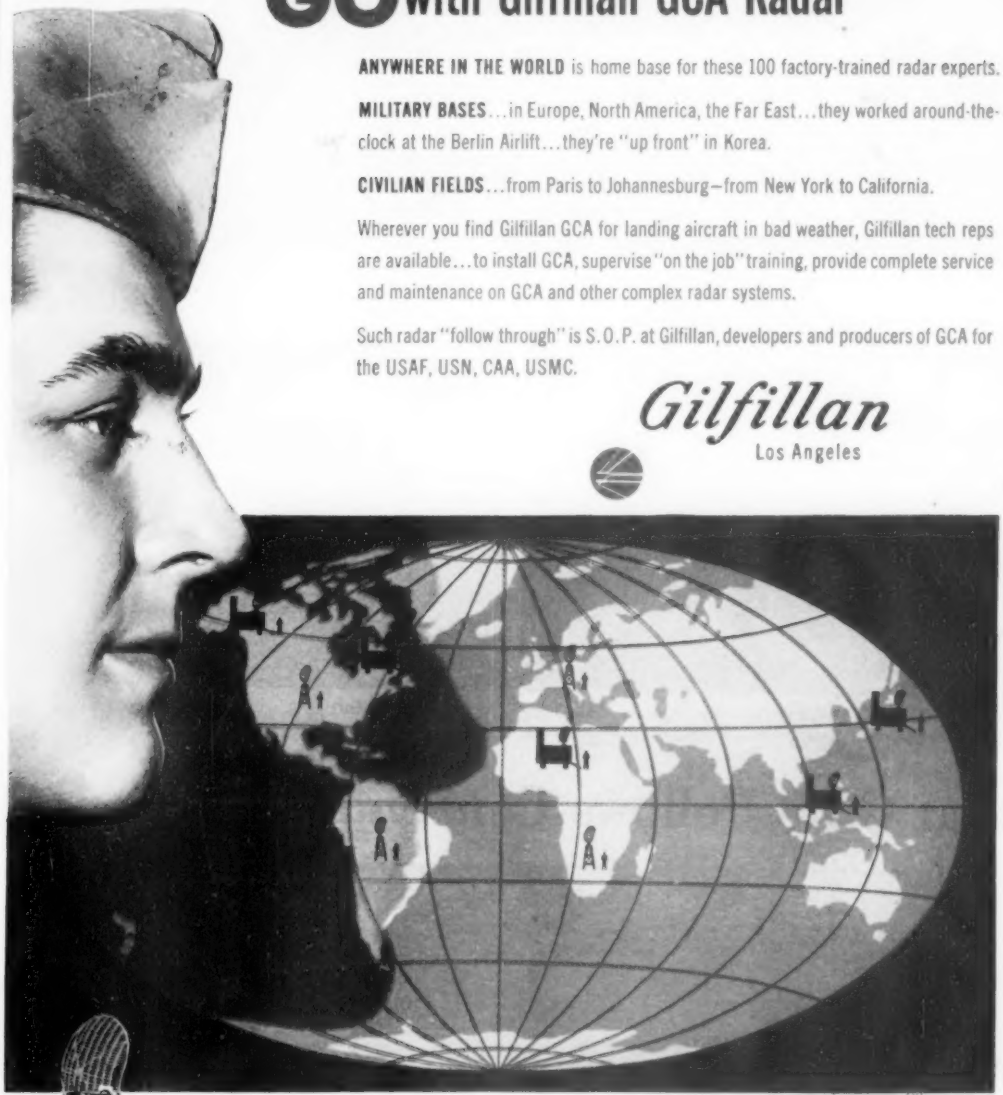
Fellowship Open

University of Wichita announces that a graduate fellowship leading to the master's degree in the field of aeronautical engineering will be awarded for the 1952-53 school year.

Stipend will be $1,000 plus tuition and fees.

Details may be obtained from the Committee on Scholarships and Student Aid, University of Wichita, Wichita 14, Kan.

100 Gilfillan Tech Reps GO with Gilfillan GCA Radar



ANYWHERE IN THE WORLD is home base for these 100 factory-trained radar experts.

MILITARY BASES...in Europe, North America, the Far East...they worked around-the-clock at the Berlin Airlift...they're "up front" in Korea.

CIVILIAN FIELDS...from Paris to Johannesburg—from New York to California.

Wherever you find Gilfillan GCA for landing aircraft in bad weather, Gilfillan tech reps are available...to install GCA, supervise "on the job" training, provide complete service and maintenance on GCA and other complex radar systems.

Such radar "follow through" is S.O.P. at Gilfillan, developers and producers of GCA for the USAF, USN, CAA, USMC.

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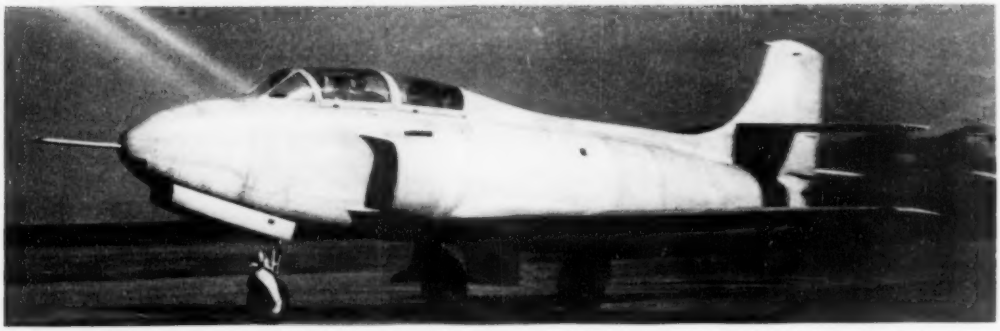
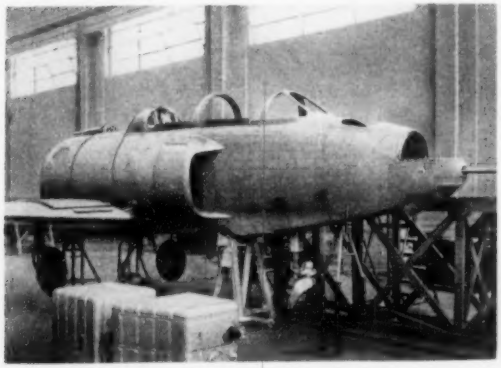
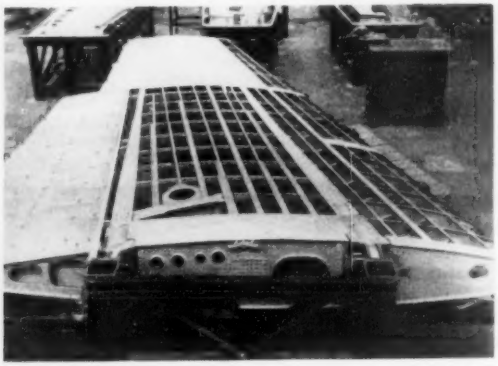
Gilfillan GCA is the first navigational aid to be adopted as standard by 24 United Nations Allies



TAXI TESTS which preceded first flight last December show off roomy cockpit, conventional lines of Italy's first turbojet aircraft.

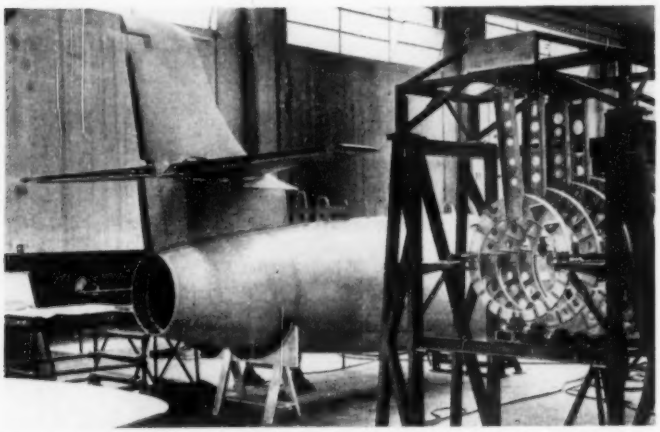


FORWARD FUSELAGE is reminiscent of Lockheed T-33. Interesting points: boundary layer removal scoops, light cockpit framing.



WING STRUCTURE is conventional, two-spar with multitude of stringers. Panel is divided at outboard end of flap into two sections.

Fiat G 80 Follows Conventional Lines



REAR BULKHEADS in jig show fuselage construction and integral-stub vertical fin (right). Partially completed fuselage of trainer-fighter rests at left.

Italy's first turbojet aircraft, the Fiat G 80 trainer-fighter, is an archetype of conventional design practice.

Hamstrung by the lack of research facilities, the Fiat design team under the leadership of Prof. Gabrielli had to hew closely to the line of current airframe design practice. Their approach is best shown in these photos depicting several constructional phases of the G 80.

Note, for example, the simple external reinforcing angle between stub fin and fuselage, and the way the tail assembly is built up from stub fin to stabilizer to vertical fin (photo at left).

And notice the way that stringer attachment clips and tail cone support angles extend the full depth of the rear ring members in design conservatism.

Current version of the G 80 (AVIATION WEEK Jan. 14, p. 21) is powered by a British de Havilland Goblin 35. Span is 36 ft., length, 40 ft.

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*Insulated bond can be provided on either inside or outside diameters, depending on direction of pressure. On type BELLMET illustrated, pressure from within supports tight bond.

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Republic Thunderjet F-84E. The seven-foot-long cockpit canopy of this U. S. Air Force jet fighter is formed from a single sheet of PLEXIGLAS II. Canopy fabrication by Goodyear Aircraft Corporation.

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Transparent PLEXIGLAS enclosures, such as this canopy on the Republic Thunderjet, are familiar visible parts on all types of aircraft. But it is the properties you *can't* see—strength, light weight, formability, dimensional stability, resistance to weather—plus clarity, that have established PLEXIGLAS as *aviation's standard transparent plastic.*

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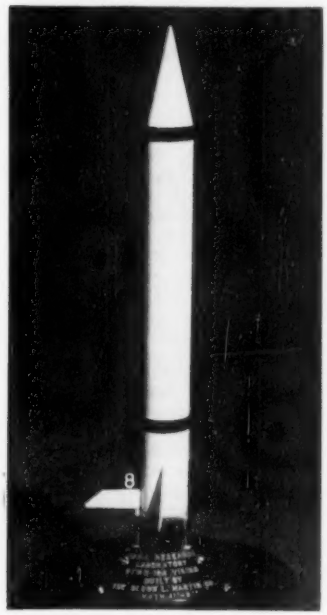
Eighth Viking Rocket Has Triangular Fins

Martin's eighth Viking research rocket is out to break the altitude mark of 135 mi. set by its older brother, Viking 7, in August, 1951. And Viking 8 is expected to better the record height by a considerable number of miles.

To do this, Martin and Naval Research Laboratory engineers redesigned the basic rocket with increased diameter, reduced length and reduced and reshaped fin area.

Major purpose of the change is to increase the storage capacity of liquid oxygen and alcohol for the Reaction



Motors, Inc. 20,000-lb. thrust rocket engine. More fuel means longer burning time, and that in turn means higher altitudes.

►**Big Change**—Most noticeable variation from earlier rounds is the triangular shape of Viking 8's fins. Originally trapezoidal, the new fins have about 75% of the area used for the first seven rounds. Presumably control will continue to be by motion of the thrust axis; earlier rounds had an external tab on each fin to correct for the misalignment of that fin. And the rocket was steered, during powered flight, by swinging the motor in a gimbal mount.

Fineness ratio of the rocket has been decreased from nearly 19 to a little more than ten. Viking was just short of 50 ft. long (or high) and had a

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CONTINENTAL...

R-975

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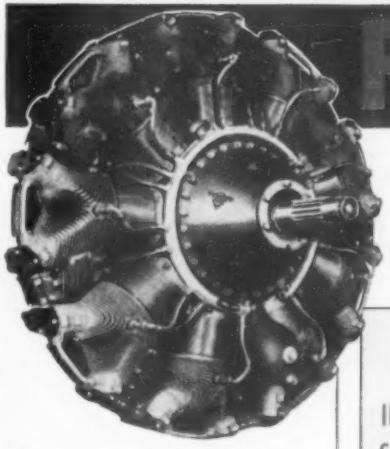

OF INTEREST to all segments of the aircraft industry is the fact that the Continental R-975, as redesigned for helicopter use, is now in production at C.A.E., for such craft as the Piasecki HUP I and HUP II and the Kaman HOK.

The completeness with which this air-cooled radial, rated at 525 h.p., has met the helicopter's high performance standards, suggests its choice for other exacting applications as well. It has special significance for manufacturers of conventional planes.

It offers them a power plant with an *extra margin of stamina*,—a margin proved by performance under conditions far more severe than are imposed on the engine of an airplane of fixed-wing type.

ON THE WAY...
GAS TURBINE POWER
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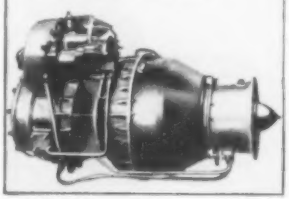
INTERMEDIATE AIRCRAFT

C.A.E. is planning production of the Continental-Turbomeca Family of gas turbines. These advanced power plants comprise four basic types—jet power, shaft power, ducted fan and air compressor—and range from 200 to 1,000 h.p. Tests forecast their wide utility, not only in civilian and military aircraft of medium power, but in numerous other applications, some obvious and others unconventional. We invite inquiries from manufacturers or individuals having specific uses in mind.



There are employment opportunities for engineers and others desiring to make a career in the field of small turbines for commercial and military use. Write giving your background and the type of work desired.

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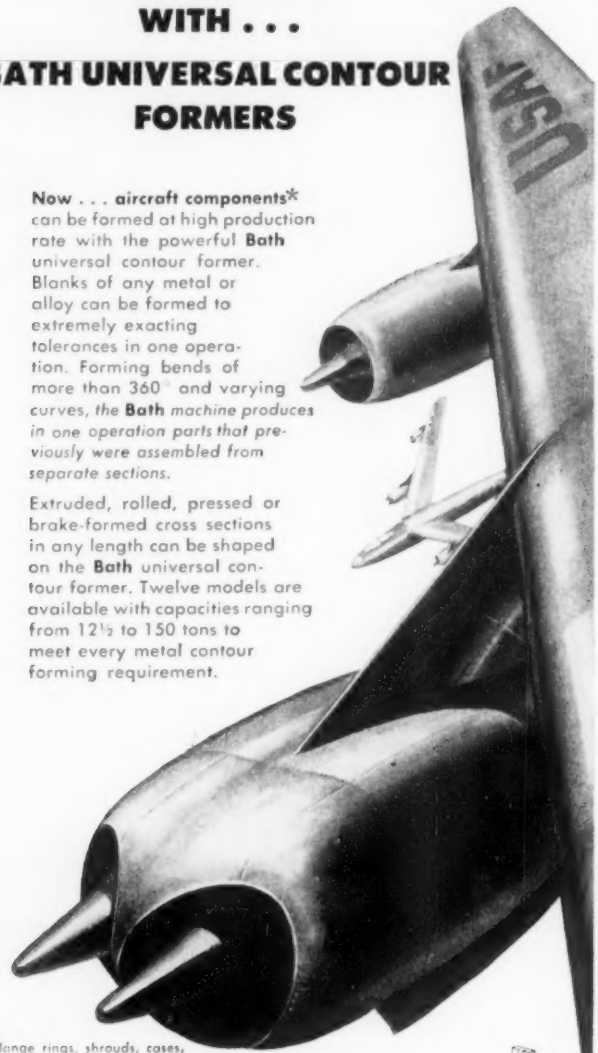
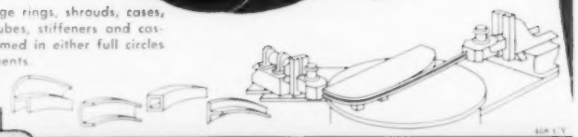
Extruded, rolled, pressed or brake-formed cross sections in any length can be shaped on the **Bath** universal contour former. Twelve models are available with capacities ranging from 12½ to 150 tons to meet every metal contour forming requirement.



*Jet flange rings, shrouds, cases, flame tubes, stiffeners and casings formed in either full circles or segments.



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32 in. diameter. Now, the Viking 8 is 41 ft. 6 in. high, and must have about a 48-in. diameter.

Designation of the eighth round is RTV-N-12A; only difference here is in the addition of the A to indicate the first basic design change in the series.

Vikings are employed for upper-atmosphere research on pressure, density and temperatures. Seven rounds have been fired successfully, although not all met performance expectations.

AIA Sees Threat in Engineer Shortage

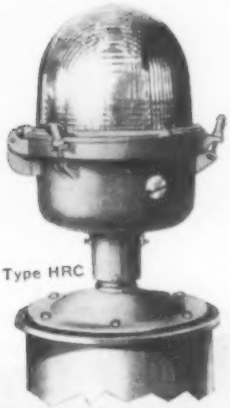
National shortage of engineers has been described as the greatest long-range threat to U. S. aircraft production by Aircraft Industries Assn. in an appraisal of the manpower problem faced by the industry. This is because the current production rate continues to increase, despite the long-range stretch-outs in production.

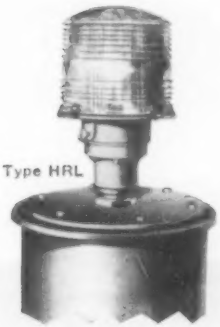
By next January, the aircraft industry will employ approximately 750,000 and will be the second largest or possibly the largest user of manufacturing manpower in the nation. Peak aircraft industry employment in World War II, however, was over 2 million. Employment as of the end of 1951 was quoted at 600,000.

Annual U. S. aircraft payroll currently exceeds $2.5 billion and is climbing, the AIA study shows. Average weekly earnings for the industry have risen $12.30 since the start of the Korean War and are $12.87 above the average for all U. S. manufacturing industries.

Effect of the revised production schedules on employment will be principally to slow employment of unskilled workers. No general layoffs are planned by major companies, and acute shortages in virtually all skilled employe categories continue.

"Latest thing, old boy. Swept back."
Aeronautics





CROUSE-HINDS *offers all 3 types*

of high intensity airport runway lights

The Crouse-Hinds Company offers all three types of high intensity fixtures to meet the three CAA Specifications (L-818, L-819 and L-820). All three fixtures (types HRC, HRL and HSL) are approved by CAA.

Type HRC utilizes a double prismatic lens system on a cast aluminum base, with a 500-watt, 115-volt lamp mounted on a movable socket. The main beams may be "toed in" or "toed out" by remote control from the tower to provide the best setting for particular visibility conditions. The candlepower is the highest of the three types. In bad weather the pilot sees more lights and sees them sooner with this system.

Type HRL is constructed with an optical prismatic Pyrex globe mounted on a 3-piece cast aluminum fixture assembly. Each fixture uses a 200-watt lamp and is provided with a series-to-series insulating transformer installed underground in the base housing.

This system has the lowest installation cost. Its use is often justified for non-instrument runways, as well as instrument runways.

Type HSL has a cast aluminum housing with two 95-watt sealed beam high intensity lamps inside and a 30-watt medium intensity light on top. Three insulating transformers are installed underground in the base. Each of the three lamps may be switched separately from the tower.

This system is economical to operate, since only 95 watts is used for the high intensity beam, and a 30-watt light is used in good weather. This fixture provides a main beam in only one direction, without the background haze resulting from the "back beam". After relamping, the sealed beam optical system is back to 100% initial efficiency.

All three fixtures provide the basic high intensity candlepower required and the three types have many construction features in common such as: cast aluminum housing, Pyrex glassware, disconnecting cable connector, same breakable coupling and standard steel base with base plate. All three units provide the necessary top light and side light needed for planes not on the approach path and all use a 5-stage brightness control.

Write for Bulletin 358-F. It contains detailed features and an impartial comparison of the relative advantages of the three systems with estimated installation costs of each.

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British to Build Co-op Windtunnel

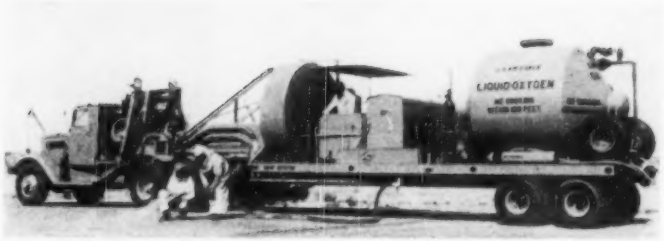
Eleven British aircraft and engine companies have begun a project to design, build and operate a cooperative transonic windtunnel which will be the largest in Britain.

Registered under the joint name of Aircraft Research Association, Ltd., the member companies are currently negotiating with the Ministry of Supply and other authorities for the site, power supply and other services.

Project was initiated by the Technical Board of the Society of British Aircraft Constructors, which reported that the progress of aircraft design demanded a transonic windtunnel.

(One can read between the lines of this announcement the shortage of first-class research facilities in Britain, possibly one contribution to the high attrition rate of British prototype aircraft.)

The member companies are: Blackburn & General Aircraft Ltd.; Boulton Paul Aircraft Ltd.; The Bristol Aeroplane Co., Ltd.; The Fairey Aviation Co., Ltd.; Folland Aircraft Ltd.; Handley Page Ltd.; The Hawker Siddeley Group Ltd.; Rolls-Royce Ltd.; Saunders-Roe Ltd.; Vickers-Armstrongs Ltd.; and Westland Aircraft Ltd.



REPUBLIC'S TRAILER-TRUCK for servicing rocket-propelled aircraft is completely self-contained. Current types of rocket powerplants can be fully serviced with this new unit, complete with generator rig, which was designed and constructed at RAC.

Republic Speeds Rocket Servicing

In interception, time is of the essence. You can't afford to waste minutes servicing a rocket-powered interceptor by complicated methods. What you actually need, reasoned engineers at Republic Aviation Corp., is a mobile, completely self-contained unit.

And so they designed and constructed one, the first of its kind, for servicing the rocket powerplant of Republic's XF-91.

▶ **Past Performance**—There have been as many fueling techniques as there have been vehicles to take the fuel. In the case of missiles, liquid oxygen and alcohol to feed the powerful rocket engines are fed into tanks at a low rate, either by pumps or by pressurizing gases. Fueling takes hours in the case of the V-2.

The Bell X-1 was fueled with nitrogen pressure to force the liquid oxygen into the tiny craft's tanks. Pumps of sufficient capacity weren't available. And the Douglas D-558-II Skyrocket was fueled with oxygen at a remote site and then trucked to the test base.

And in the cases of both airplanes, alcohol and pressurizing nitrogen gas were serviced in separate operations from portable trailers.

▶ **Present Performer**—Republic's truck

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It's important in crop spraying to get thorough coverage of the crop. That calls for reliable equipment like the Aero Mist Master which depends on STOW flexible shafting to transmit power from the accessory gear box to the pump which delivers the insecticide to the spray nozzles beneath the wing.

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◀ *Write today* for your free copy of Bulletin 515 containing complete engineering data on STOW flexible shafting.

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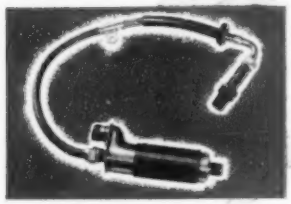

Exceptional heat resistance (up to 500 F) makes G-E silicone rubber ideal for insulation in harnesses for aircraft and automotive ignition systems.

Now you can design electrical components which will operate over a wide temperature range—thanks to the unusual properties imparted to these products by General Electric silicones. Substantial reduction (25-40% on an average) in size and weight of transformers, generators, and other electrical equipment is also possible when G-E silicones are used in the insulation.

Have you considered G-E silicones in your products? Perhaps you need a resin or a varnish for bonding or impregnating purposes. Perhaps you need a resilient material for gaskets or sheeting. Or do you need a fluid to impart water-repellency to masonry surfaces? Whatever your need, it will pay you to investigate G-E silicones. You may find a ready answer to your problem.

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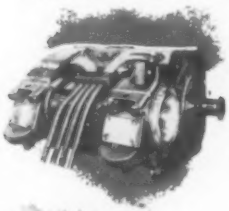

Save rewind costs— on heavy-duty motors because G-E silicones in "Class H" insulation withstand high heat and mechanical stress.

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Want more information? More examples of G-E silicone developments of importance to industry are to be found in *The Silicone Story*. Send the coupon today for *your* free copy.

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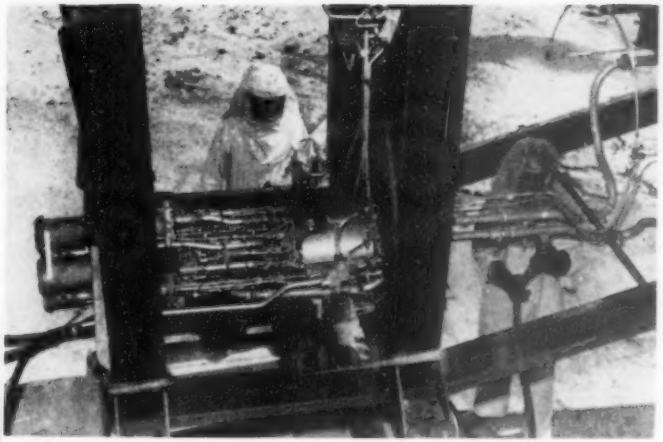

REACTION MOTOR rocket engine for Republic's XF-91 is set up here just as in the aircraft. Four-cylinder engine develops 6,000-lb. thrust, powered Bell X-1 and Douglas D-558-II on their record-breaking speed flights.

has several apparent advantages, the first being that everything for servicing is on the trailer—propellants, pressurizing gas, fire-extinguishers, pump and compressor.

The large tank at the rear of the truck holds 900 gal. of liquid oxygen. It is double-walled and insulated.

At the forward end of the truck body is a water-alcohol tank which can hold 700 gal. Eight nitrogen bottles complete the truck storage facilities.

An Air Force B-8 engine-generator rig is built on the body, and a fire-extinguishing system is also included. A compressor and electric pump complete the list of auxiliaries.

Weight of the entire trailer-truck is 12½ tons. As few as two men can operate the rig.

50,000-Hp. Jet Engines Forecast

Far more powerful engines, equipped with greatly improved safety and performance devices, were anticipated for the future by E. B. Newill, general manager of the Allison Div. of General Motors, in a recent talk to the Society of Automotive Engineers at Detroit.

"Jet engines with thrusts equivalent to 50,000 hp. will be built," he predicted, "and the aircraft in which they will be installed will be operable by one or two men. We are now thinking in terms of aircraft power equal to that of destroyers or smaller cruisers a few years ago."

► **Developments**—As proof of his expectations he sketched in what has happened in the years since World War II, noting that Allison J35 thrust per pound of engine weight rose from 1.5 to 2.42, and J71 thrust per pound rose to more than 3.0 with afterburner. Overhaul cycle time on the J-35 has risen from 10 to 500 hours.

Afterburners, Newill indicated, would do much to augment thrust. By use of excess cooling air, he pointed out, thrust can be increased one-third, although it results in high specific fuel consumption; this one-third thrust increase doubles the engine's appetite for fuel.

To improve speed and climb performance in the future, Newill suggested four lines of approach: greater thrust, extended use of afterburners, retractable air inlet screens, and better materials.

Air inlet screens function well on the ground, he noted, as shields against gravel, but reduce the amount of air breathed in during flight.

In combat, some jets flying formation have swallowed packets of bullets fired from aircraft ahead, Newill said.

Range increase, another long-term objective of the jet makers, is compounded, in Newill's thinking, of higher efficiency of the engine components, multi-stage turbines, higher compression ratios, use of two compressors and two turbines, variable jet nozzles, and variable inlet guide vanes.

► **Higher Pressures**—Compression ratios have gone from 3.5 to 5, he noted. And he saw no reason why these should not ultimately rise to a level of 9 or 12 just as in Otto cycle engines.

Improved safety and durability, he anticipated, would come about through elimination of vibration, better bearings and lubrication, retractable anti-icing screens, ice detectors, better

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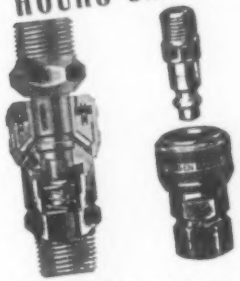

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materials, and improved mechanical design.

He discussed the crashes in Indiana last June of a number of Republic F-84 Thunderjets in an Air Force formation, saying they were caused by sudden entry into a moisture-laden area and subsequent, almost instantaneous, icing inside the jet, cutting off fuel feeds. An ice detector of some sort—he offered no specifics beyond the idea itself—would aid in anticipating such conditions.

He indicated strongly, by use of comparative mileage studies, that for most aircraft applications the turboprop engine was more practical than the turbojet. Speed, he noted, is not as great, but range is considerably farther, and the speed sacrifice is not too severe as things now stand. His tables also indicated that turboprop engines give aircraft range equal to that of reciprocating engines, and at higher speeds.

How much for jet engines against traditional powerplants? This question was put from the floor afterwards. Newill answered that a 2,150-hp. reciprocating engine was made in small quantity by Allison and sold for about $22,000. Jet engines producing thrust equal to about 6,500 hp. were later being built for about that same sum, he reported. In quantity production, he said, that latter price might be halved.

Answering another question, he anticipated that the market for smaller turbine engines, on the order of 150 to 200 hp. and using two combustor cans rather than eight or ten, would be limited mainly by fuel consumption problems.

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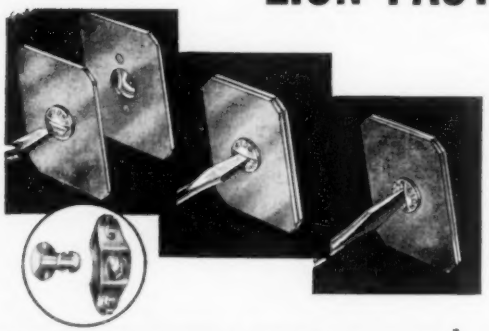

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THRUST & DRAG

Maurice Smith, editor of our excellent British contemporary, Flight, has sent us a worthwhile little booklet called "British Aircraft to Scale." Most of the material is reprinted from the special issue Flight published on the occasion of the 1951 Farnborough show. Maurice says that the folder ". . . contains practically all the figures which may be printed at this time." And on looking through the pages of drawings by Barry Jones, and scanning the spec tables at the end, I'm inclined to agree. So if you'd like a bound collection of planview drawings of all the current British aircraft, rendered to the same scale, plus tables of dimensions and performance, send to Iliffe & Sons Ltd., Dorset House, Stamford Street, London, S.E. 1. Price is 1s 6d., which works out to about 21¢; however, sending a quarter would pay the postage and handling, I think.

Induced Drag Coefficient award for the week: To Mr. Roy H. Rice, North American Aviation engineering vice president. Mr. Rice, recently speaking of the difference between MiG and Sabre, was quoted as saying that the MiG has a very elementary flight control system comparable to the Mustang's. "Therefore we are in a position to know that this type of system is entirely inadequate for today's operating speeds." But Mr. Rice didn't say that the Russians, not knowing any better, use that "entirely inadequate" control system to crawl all over North American's B-45 jet bomber; Boeing's B-29 piston-engine bomber.

Recently we received the first issue of the new Dutch aviation magazine, Avia-Vliegwereld, official organ of the Royal Netherlands Aero Club. Naturally it is written in the Dutch language, from which—if you understand technical German—you can make some sense. Chief recommendation is a magnificent cutaway of the Lockheed L-1049C Super Connie by Rudolf Das. The magazine is to be published every two weeks. If Das' material is to appear regularly, that would seem to be sufficient excuse to subscribe. Editorial offices are at Anna Paulownaplein 3, The Hague. —DAA

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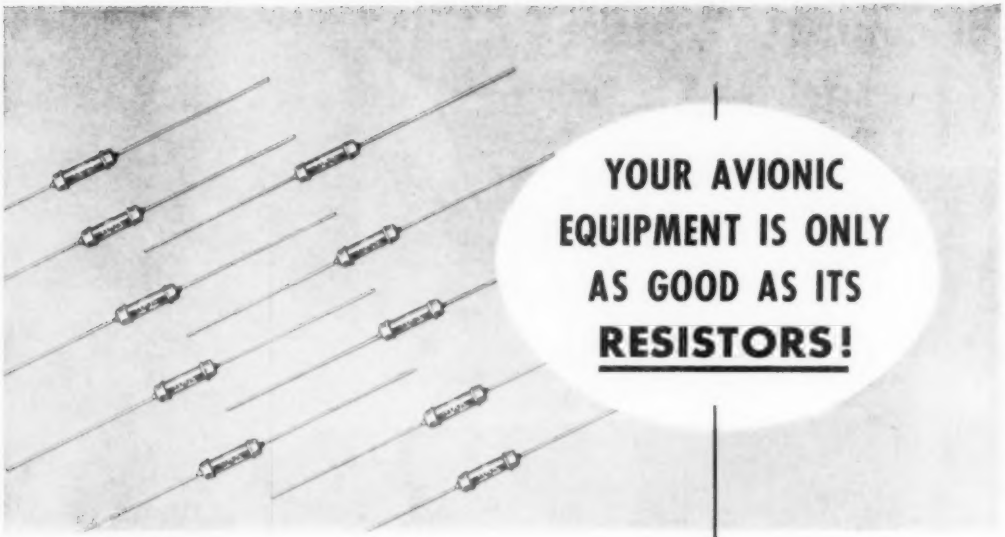

YOUR AVIONIC EQUIPMENT IS ONLY AS GOOD AS ITS **RESISTORS!**

Of all the components that make up avionic equipment, resistors are among the most important. Yet, because they are insignificant in size and price, this importance is too often overlooked.

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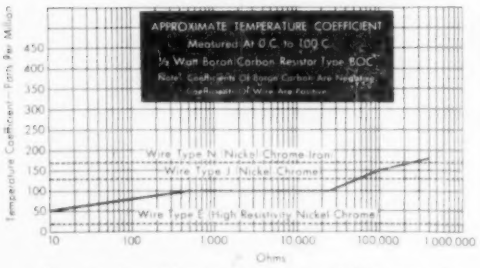
Largest manufacturer of resistors in the world, we have the modern equipment and engineering staff to make testing a *continuous* job. *Test data* guide us in producing the widest line of resistors in the industry. And *test data* help us take the lead in pioneering new developments—many for aircraft and guided missiles.

For instance, one of three new products soon to be made available for avionic equipment:—

The New IRC Type BOC Boron-Carbon PRECISTOR



Here is the ultimate in stable, reliable non-wire wound units. Exposed to a temperature of 65°C. for one hour, newly developed BOC shows a resistance change of less than .2%. This is four times the resistance to heat required in aircraft and guided missiles!

Rated at ½ watt, Type BOC meets the most critical circuitry needs—conforms to all requirements of MIL-R-10509. Voltage coefficient is less than 20 parts per million per volt. Load life is extraordinary; on a 500-hour test at ambient temperature of 40°C., resistance change will not exceed 2%.

Test data and complete information on these new Type BOC Boron-Carbon PRECISTORS are yours without obligation. Write today for Catalog Data Bulletin B-6. It belongs in your file. Address Dept. F.

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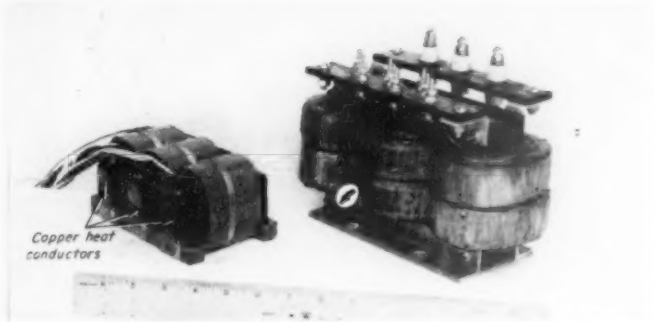


NEW-TYPE TRANSFORMER (left) and old have the same temperature rise characteristics, but note the size difference made possible by turbulent cooling.

How to Keep Cool and Lose Weight

Turbulent air flow around equipment sharply raises heat transfer efficiency and may permit 50% weight cut.

By Philip Klass

A new technique for getting rid of heat generated by avionics equipment has been developed which offers an attractive solution to current high temperature operating problems. The new cooling approach may also permit up to 50% reduction in the overall weight of avionics equipment.

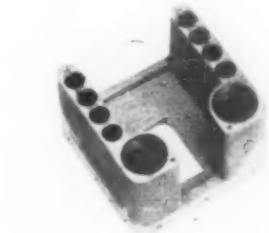
The development, known as turbulent air cooling, was disclosed by Leonhard Katz of the Raytheon Manufacturing Co. in a paper presented at the recent annual convention of the Institute of the Aeronautical Sciences in New York City.

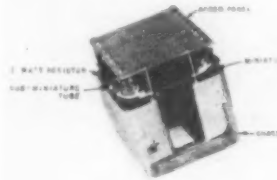
▶ **The Problem**—With the greatly increased use of electronic equipment, the amount of heat to be dissipated has grown. As flight altitudes go up, reduced air density provides less cooling medium. Higher plane speeds raise ram air temperature, lowering the difference in temperature between the cooling air and the equipment to be cooled.

Sub-miniaturization has aggravated the problem. Craming sub-min components in a fraction of their previous space doesn't reduce the amount of heat to be dumped—only the effective radiating surface area.

▶ **Weight Reduction**—Application of this new turbulent air cooling should now make it possible to reduce the size and weight of certain avionic components, like transformers, by more than 50%, according to Katz. This is important since transformers represent a sizeable portion of the weight and size of avionic equipment.

The new technique is a result of a USAF-sponsored program at Raytheon. Their study of existing techniques using laminar flow, forced-air cooling indicated that heat transfer efficiencies were only 2 to 20%. (Heat transfer efficiency is the ratio of actual coolant temperature rise to maximum possible coolant temperature rise, i.e. to the temperature of the hot body.)





THIN-WALL CASTING (top) serves as chassis for avionics components, to transfer their heat to the cooling plate.

The use of turbulent air flow cooling suggested itself because it reduces the amount of stagnant air layer impeding heat transfer between a hot surface and cooling air. At a Reynolds number of about 2,300, laminar flow becomes turbulent flow. When this happens, there is a sudden and sizeable improvement in the heat transfer coefficient.

Even more important, once the turbulent flow condition is reached, a further increase in air velocity gains almost three times as much cooling as the same increase would achieve under laminar flow conditions.

▶ **Practical Application**—By moving outside air through metal tubes at a Reynolds number considerably in excess of 2,300, practical use can be made of turbulent air flow cooling. These metal tubes form a part of a metal base, called the cooling plate, which in turn mounts the avionics equipment. The air passages may be formed in the cooling plate by milling or by fabrication.

With this technique, a heat transfer efficiency of 70% can be obtained with only a 1-psi. pressure drop in cooling air pressure; an efficiency of 90% has been obtained in some models using a 10-psi. differential pressure.

The remaining problem is to transfer the avionics-generated heat to the cooling plate. This is done largely by metal-to-metal conduction. Tubes, resistors, capacitors, etc., are buried and sealed in cylindrical holes in the wall of a thin metal casting which serves as the chassis. A large center opening in the casting accommodates larger components such as transformers.

Heat from individual components within the casting is transferred, largely by radiation, to the casting walls. Convection is purposely avoided to prevent hot spots. Once the heat is transferred to the casting, conduction carries it to the cooling plate and thence to the cooling air.

▶ **Temperature Rise**—Heat is transferred so efficiently that the cooling-plate temperature rise is limited to 20C above the cooling air. Temperature rise of components within the chassis is limited to 5C above the cooling plate temperature, or 25C above cooling air temperature.

▶ **Smaller Transformers**—A major factor in determining transformer size and weight is temperature. If the heat generated in the core and windings can be carried away more effectively, the rating of the transformer can go up, or the size and weight can come down for the same rating.

Raytheon has attacked this problem by building copper conducting [illegible] into the coils and core of a transformer to carry off the heat to the cooling plate. Using these techniques, Raytheon has constructed a 1,100-v.a. 3-phase trans-

AT TOP ... a pull type miniature PSP Solenoid developing 4 pounds pull at 24V D. C. continuous duty. Stroke ½ inch. Can be wound for 110-125V D. C. operation if required, and in other sizes and capacities for specific needs.

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DESIGNERS AND MANUFACTURERS OF THERMAL DEVICES

COOLING PLATE for use in turbulent cooling techniques is shown disassembled.

former whose weight and volume is about ¼ that of a standard transformer of the same rating.

Maximum temperature rise of the newly designed transformer is 20C above cooling plate temperature, or a total of 40C above ambient cooling air. And Raytheon thinks that even further improvement may be possible.

Conservatively making allowance for the added weight of air ducting and expansion turbine required at high ram air temperatures to provide cooling air, Katz and his associates think that an overall avionics system weight saving of 50% is possible using turbulent air cooling.

Straight-Line Mapping Navigator

McGraw-Hill World News:

Melbourne—A new aerial mapping and surveying device designed to permit straight-line flight with a minimum of lateral overlap on return legs has been developed by the Electrotechnology and Radiophysics Divisions of the Australian Commonwealth Scientific and Industrial Research Organization.

The device's construction resembles the course-line computers under development in this country. However the Australian device operates on the "2-R" principle of using information on the range to two different points to establish airplane position. This range information is obtained from two Shoran radar beacons.

The "2-R" principle is not acceptable for the course-line computers since it gives the ambiguity of two possible points of position. Hence most current course-line computers under development are believed to use the "R-O" principle (range plus bearing information). However the "2-R" arrangement is satisfactory for establishing a straight line of flight.

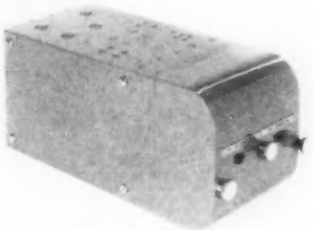
Deviation from straight-line flight is presented to the pilot on a zero-center indicator. The signal could presumably be fed into an autopilot to provide automatic adherence to straight-line flight. Flight tests of the new device under manual control are reported to have given flight path deviations as low as 0.02 mile.

Collins Navigation Aids Go in GM Fleet

Collins Radio Co. reports a fleet order for its new VHF visual steering equipment (competitive with the Sperry Zero Reader and Bendix Omnimag) has been placed by General Motors Corp. for installation in its executive aircraft. The order is for 19 sets.

Simply described, the equipment pictures for the pilot his position in relation to his chosen course and shows him how to steer to approach smoothly and stay on course. It is an integrated system, consisting basically of a steering computer box and two visual aids in the cockpit—a "Course Indicator" and "Approach-Horizon." The equipment can be used for cross-country navigation, using compass or omnirange facilities, and for ILS letdown.

Collins says pilot production on 50 sets already is underway and that full scale production is expected to start in the latter part of the year.



Light Oscillograph

A new small lightweight 14-channel recording oscillograph has been announced by the Midwestern Geophysical Laboratory. The unit, called Model 555, weighs 12 lb., operates from 24-28 v. d.c. power and uses 3½ in. paper.

The oscillograph has an electronic timer which places timing lines on the recording paper at .01- or 0.1-second intervals chosen by selector switch. Chart paper speed is continuously variable between ½ and 12 in. per second. Galvanometers are available with undamped natural frequencies ranging from 100 to 3,500 cps.

The unit comes in two different models; one has a 50-ft. magazine, the other holds 100 ft. of paper.

Midwestern Geophysical Laboratory, Tulsa, Okla.

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PRODUCTION

Production Rising, Profits Lagging

Year-end reports indicate that industry's 'get-ready' period is just about over; 1952 should see new peaks.

By William Kroger

Outstanding characteristics of aircraft manufacturing in a rapid build-up period are being sharply defined in annual reports for 1951 now being released, and future trends are being pointedly shown.

Three of the most prominent factors in the industry are nicely delineated by three recent reports. How slowly output rises in initial stages of a program can be judged from studying the Douglas Aircraft report. A reputed threat to the industry's future in federal tax policy is set forth by Convair. An example of how spiraling cost eats up revenue of large and small manufacturers alike dominates the report of Ryan.

But despite the problems and worries, executives of all three firms believe 1952 will be an even better year than last, which saw revenue, operating income and backlogs reach an all-time high for a period of no all-out war.

Douglas

Perhaps the most significant figure in the report of Douglas Aircraft Co. for the year ending Nov. 30, 1951 is not financial. It indicates that shipments of airframes and spare parts for the fiscal year totaled 12,741,000 lb. In contrast the figure for the 1950 fiscal year was 7,251,000.

The 1950 report stated that 246 planes were shipped that year. A rough estimate of Douglas 1951 deliveries is approximately 500 planes, or about twice the 1950 shipments.

▶ **Nearly Ready**—This low level of production for a large company, combined with the company's belief that higher sales will be realized this year, tends to support the theory that the aircraft industry's "get-ready" period has about ended. This is also reflected in the size of Douglas inventories (before crediting progress payments) which more than doubled from $77,744,109 in 1950 to $191,677,093 in 1951.

President Donald Douglas commented that the mounting inventories created a tremendous drain on the company's cash. "Additional borrowing may be necessary until this expanded production effort reaches delivery stage and the rate of expansion is reduced. Thereafter liquidation of inventories will begin to produce additional revenues. . . ." However, he gives no indication of when this step-up in production will occur.

The Douglas backlog was still rising, pushing inventories higher, as the fiscal year ended. It was $1,635,271,000 on Nov. 30; $1.8 billion on Dec. 31, with $200 million representing commercial orders.

The composition of the backlog plus the division of sales for the year seem to put Douglas in an extremely advantageous position in the commercial market. Of the $225,173,226 in sales (AVIATION WEEK Mar. 3, p. 7), 21% was for commercial planes and spares.

▶ **Tax Take**—On these 1951 sales, Douglas realized an operating profit of $18,597,182, reduced to a net income of $6,912,829 by taxes of $11,684,353. The size of the taxes made an important difference. In 1950, Douglas had income of $131,524,900, operating profit of $13,214,440 and net income of $7,214,440 because of the smaller $6-million tax bill.

The report says that more DC-6 type planes have been bought by commercial operators than any other airplane in its class, that DC-6B orders total 150 and that all told, 24 airlines have purchased 349 planes of the DC-6 series.

Douglas intention to keep its rank in the commercial market seems apparent in the veiled statement that "during the year studies have been undertaken to determine the desired characteristics and optimum configuration of the future jet transport. These studies have progressed to the point that a decision can be made in the near future and a development program initiated."

As is true of other annual reports now appearing, the Douglas document is skimpy on details of activities for the military. Some highlights:

• **R6D-1 and R4D-8 transport** (DC-6A and Super DC-3) deliveries to the Navy began last October.

• **F4D Skyray** Navy interceptor first flew in January, 1951. Douglas says it is "the smallest and highest-powered interceptor in its field." Air Force also is interested in the F4D. Plane is in production at El Segundo.

• **The turboprop Globemaster** is identified in the report as the YKC-124B, although a year ago it was referred to as the YC-124B. The KC designation for AF planes indicates an aerial tanker for refueling operations.

• **B-47 modification** is due to start at Tulsa this spring. By the end of the fiscal year, 80% of the material for fabrication of the first block of B-47s was on hand.

• **Ten major missile projects** for research, development, and production of "missiles and missile accessories" are being worked on.

Convair

Aided by the tax laws that Board Chairman Floyd Odlum criticizes so pointedly and at length, Consolidated Vultee Aircraft Corp. turned in a net profit of $7,750,524 for the year ending Nov. 30, 1951 on revenue of $322,295,323 (AVIATION WEEK Feb. 11, p. 7).

The $3.8 million in federal income

(*Continued on p. 49*)

NEW NORTH AMERICAN SABREJET INTERCEPTOR, THE U. S. AIR FORCE'S F-86D, POWERED BY A G-E JET

THE FASTEST TEN YEARS IN HISTORY

Builder of the first U. S. jet engine, General Electric reports on latest developments since 1942

Ten years ago next week, America's first aircraft jet engine was put on test at a General Electric plant in Lynn, Mass. Six months later, jet-powered flight became a reality in America when the Bell P-59 Airacomet, powered by two of these G-E engines, took off at Muroc, Cal., and flew over 400 miles per hour. Fast? Yes—but less than ten years later, combat pilots battle at the speed of sound!

In World War II, military leaders had given jet flight a top priority because they believed the maximum limit on speed for a propeller-driven airplane had almost been reached. The only answer was a new kind of power plant. So the Army Air Corps asked American industry to build a jet engine, based on an English design. General Electric, chiefly because of its half century of experience in designing and building industrial steam turbines and aircraft turbosuperchargers, was logically chosen to do the job.

Now, ten years later, a fighter pilot can fly almost twice as fast as he could in 1942. That's because today's jet engines are 8 times more powerful than the 1942 model! Even more powerful jet engines are moving from General Electric drafting boards to mock-up stage.

LONG EXPERIENCE with steam turbines and aircraft turbosuperchargers prompted the Army Air Corps to turn to General Electric for the first U. S. jet engine. G.E.'s Dr. Sanford A. Moss (shown on right with Lt. Gen. "Jimmy" Doolittle) fathered the turbosupercharger, which made high-altitude bombing possible in World War II.

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G-E JET ENGINES POWER ALL THESE MODERN AIR FORCE PLANES

Convair B-36, intercontinental bomber (6 piston engines, 4 jets)

North American F-86 "Sabre," combat-proved fighter

Boeing B-47 "Stratojet," fastest known bomber

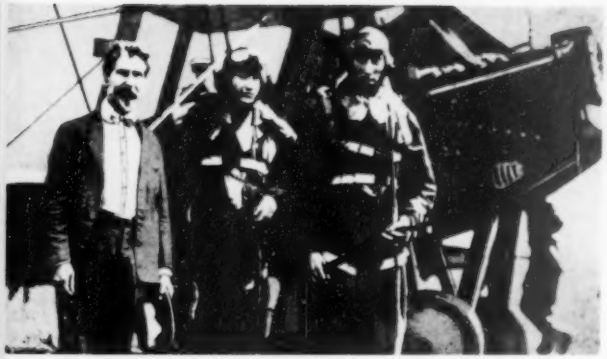
North American B-45 "Tornado," first operational jet bomber

Republic XF-91, high-speed interceptor

Martin XB-51, ground-support bomber

North American F-86D, fast-climbing interceptor

GENERAL ELECTRIC



FORERUNNER of the modern jet engine, the General Electric turbosupercharger was developed in cooperation with the Army Air Corps and test flown in September, 1919.

RESEARCH and creative engineering help maintain G-E jet leadership. Here, technicians prepare to test compressor for radical new jet engine.

FASTER, FARTHER, HIGHER

Engines designed and developed by General Electric have powered more planes, set more records, flown more hours than all other U. S. jet engines combined.

Leader in jet engine design and development back in 1942, General Electric has stayed out in front. It has done so by constantly looking ahead to the future demands of the military and the aircraft builders.

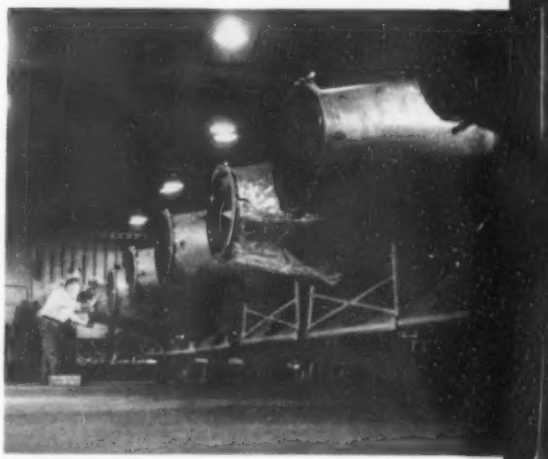
Pilots always want more speed. So G-E engineers developed a better jet engine that propels a plane at more than *12 miles a minute!* They always want more distance. G.E. made its engines lighter, reduced their fuel consumption and thereby helped to multiply jet aircraft range six times. Yet today's G-E jet engines cost less for the power they produce than their 1942 ancestors.

There is no let up in the pace. Even as you read this, G.E.'s atomic research is being combined with its jet-engine experience. Its engineers are now hard at work designing an atomic aircraft engine for the Air Force.

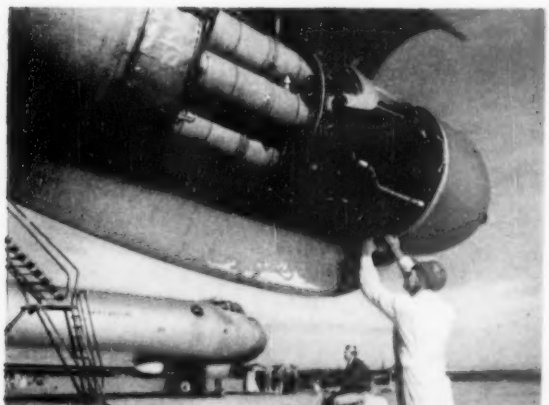
You can put your confidence in—

GENERAL ELECTRIC

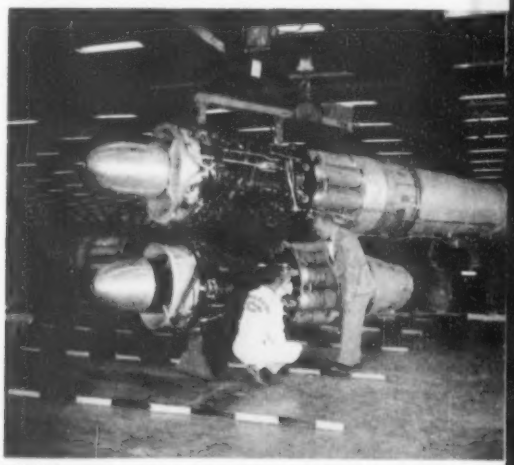
230-1



MASS PRODUCTION of jets is a reality at two big G-E plants. Exact output is a military secret, but jets are being produced at an unprecedented rate.



WORLDWIDE SERVICE organization, unequalled in the industry, helps keep G-E jets (shown here on Convair B-36 intercontinental bomber) operating at peak efficiency.



THRUST or "push" of G-E jet is increased by afterburner, shown on the top engine. Pilot can climb faster, gets greater bursts of speed in combat.

New and exclusive office procedures—using Remington Rand's unique team of Punched-Card Methods and Kardex Visible Systems—give you the facts you need to get top production from available facilities . . . at lowest possible cost!

2 ways to get more production—faster

1. Shorten the production planning cycle by getting firm schedules into the plant faster . . . and
2. Speed actual production by eliminating the causes of many delays on the production line.

Here's how you do it. Use Remington Rand punched-card machines to develop, correlate, sort and print the "mass" of facts you need for efficient production planning. It's the fastest method known!

Then, for effective *control*, post essential facts to a Kardex visible system. Kardex graphically charts the facts you need to determine scheduled requirements and control procurement, receipts and disbursements of all parts and materials.

Users report these outstanding results. They maintain schedules . . . meet promised delivery dates . . . keep all inventories in balance. What's more, they secure all the facts they need to comply with government regulations on inventories and to report requirements under CMP. Most important, they get these facts as a routine procedure without maintaining separate records.

For Production Executives: New 56-page study, *Production Control Systems and Procedures (X1268)*—outlines complete procedures for engineering, production planning and progress, machine load, material and tool procurement and control. Call the nearest Remington Rand Business Equipment Center, or write to Management Controls Reference Library, Room 1726, 315 Fourth Ave., New York 10, New York.

Remington Rand INC

(Continued from p. 44)

taxes that Convair is paying would have been $7.8 million but for the carrying forward of approximately $4 million in losses of previous years. This would have reduced the net to about $3.7 million—a far cry from the $10,241,644 net profit of 1950. But the 1950 net was exempt from federal income taxes because of the same loss carry-forward provisions of the tax laws.

As is true with Douglas, Convair inventories in 1951 more than doubled over the 1950 figure, from $16,025,621 to $41,336,726, again indicating the expansion of production. But the report is not nearly so informative about the 1951 work of the company as it is about the effect of high taxes.

The bulk of Convair's business is transacted on a cost-plus-fixed fee basis, which Odlum says leaves the company —after taxes—with less than one percent return on sales. He seems to prefer a sliding scale fee or "incentive" arrangement.

The company's largest income producer, the B-36, started into production years ago on a CPFF contract which, normally, would have been changed by this time to a conventional contract.

▶ **Guided Missiles**—From the annual report, it would appear that Convair is directing more and more of its efforts toward guided missiles. The report claims that Convair was one of the first aircraft manufacturers to embark actively in the research and development of missiles. One outcome is the 1,330,000-sq. ft. plant that the company says is the "first plant in the United States constructed exclusively for the production of guided missiles."

It is also a very large plant for missiles. It is as large as the Willow Run plant of Kaiser-Frazer (used during World War II to produce B-24 bombers), larger than several aircraft plants in the country, and more than one-third the size of Convair's huge Ft. Worth factory that turns out the intercontinental B-36.

Another possible indication of Convair's increasing preoccupation with missiles is the cover of the annual report which depicts a missile, not an airplane, in flight.

Other gleanings from the report:

• **Total employment** on Nov. 30 was 52,000, compared to 40,000 a year previously.

• **Successor to the B-60** already is under study. Convair gives no clue to what it is, saying merely "company is well advanced in preparation for this next step" (the period "in which new techniques and new types of planes will be required").

• **Convair 240 orders** cover 149 airplanes. When these are delivered, 25

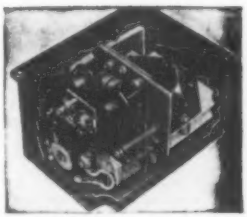
. . . all are equipped with the new Hartman 400-ampere high interrupting capacity cutouts

Modern wide speed range generators of large aircraft—designed to meet heavy load demands of electronic devices and other equipment formerly actuated by non-electrical means—pose unusually difficult control problems.

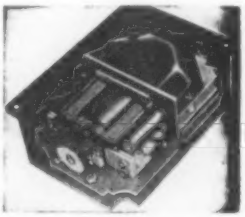
For example, 28-volt generators can produce up to 175 volts if a short circuit applies full field at high rpm as on takeoff. In addition to being able to interrupt these high voltages from sea level to 50,000 feet, control relays must also give trouble-free operation through thousands of cycles at rated capacity . . . must withstand wide temperature ranges, dust, humidity, vibration, acceleration and shock.

These new Hartman Reverse Current Cutouts have an interrupting capacity greatly in excess of all requirements under all conditions. That's why today manufacturers and operators are turning to these new cutouts for use on new and existing aircraft.

So if your problem involves d-c controls, turn it over to Hartman where it will be analyzed, engineered and produced with an efficiency that comes from nearly half a century of specialization.



New Hartman 400-Ampere 28 Volt Reverse Current Cutout (A-750D)



New Hartman 400-Ampere 28 Volt Contactor for aircraft with panelized systems (A-751D)

the Hartman Electrical Mfg. co.

"D-C CONTROL HEADQUARTERS" MANSFIELD, OHIO

PROBLEM:

Stop Ignition Cables from Burning Out!

This natural gas collector pumping station was out of service at least one day out of every 30, causing a costly loss in gas production. Heat from the gas burning motor charred and cracked the organic rubber insulation on the ignition wires. Leakage of the high voltage spark led to misfiring and failure of the motor. Added to the loss in gas production was the continuous replacement cost of the ignition cables.

SOLUTION:

SILASTIC*, the Dow Corning Silicone rubber.

Ignition cables insulated with Silastic were installed because this Silicone rubber will withstand long exposure to temperatures ranging from —100° to over 500° F.

RESULT:

No Ignition Cable Burn-outs in 2 Years.

The Silastic cables have been in use for 2 years, will probably last the life of the motor. That means reduced maintenance costs, uninterrupted performance and full capacity gas production.

Silastic has high thermal conductivity and excellent dielectric properties over a wide range of frequencies. Silastic remains soft and pliable in sub-zero temperatures, and resilient after long contact with hot oil at temperatures in the range of 400 F. That's why design and production engineers specify Silastic for hundreds of applications where other resilient materials are subject to rapid failure.

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send today for your copy of Silastic Facts No. 10 — containing new data on the properties, performance and applications for all Silastic stocks.

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Cleveland
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In Canada: Fiberglas Canada Ltd., Toronto
Great Britain: Midland Silicones Ltd., London

airlines will be using either Convair 240s or 340s.

Ryan

A good example of how a rapid build-up can make a manufacturer writhe under previous commitments is furnished by the report of Ryan Aeronautical Co. for the year ending Oct. 31, 1951. Its gross nearly doubled, but costs shot up so fast that operating income dropped off about 25%.

▶ **Spiral Squeeze**—Ryan was caught in an inflationary squeeze. Most of its fiscal 1951 income came from work on contracts signed before Korea on a fixed-price basis. Inflation since then produced this kind of result: Income (1950: $12,512,851; 1951: $22,277,175. Expenses (1950: $11,304,686; 1951: $21,449,571. Operating income (1950: $1,208,165; 1951: $827,604.

After taxes, which of course were lower in 1951, Ryan netted $635,165 in 1950 and $402,604 in 1951.

President T. Claude Ryan shares the other manufacturers' view that taxes are so high they are not leaving sufficient funds to reinvest in the company. But he believes that the 1951 operating results will not be repeated and that work on contracts signed after Korea will yield higher earnings.

Ryan temporarily retired from production of complete, conventional aircraft in 1951, delivering the last of 151 Navions that had been scheduled before material restrictions were imposed and military business increased. But the report highlights the growing interest of the company in other complete aircraft work.

Ryan now is in production of complete rocket motors. The motors are of a type developed by the California Institute of Technology and will be installed in undesignated "advance types of guided missiles." But as Ryan also reports the motors are being built for Douglas, it is likely they are for the Nike or the Sparrow (more likely the latter), both of which are in production at Douglas. A further contract for the motors has been obtained from Firestone Tire & Rubber Co.

During fiscal 1951, Ryan delivered a test quantity of XQ-2 jet-propelled pilotless target planes to USAF. The target plane project is sponsored by Air Force, Navy and Army, although tests of the craft are being conducted at an Air Force base. Only detail given of the XQ-2 is that it is about one-half the size of a jet fighter.

Other facts about Ryan disclosed in the report:

• **External fuel tanks**, largest known to be in production, reached quantity output late in the year.

• **Jet propulsion research**, under way for three years on Navy contract, is scheduled to go "into a new phase of advanced development."

• **Backlog** reached $41,342,204 at end of fiscal year, and increased to $45,500,000 by Dec. 31, 1951. On Oct. 31, 1950, backlog stood at $21,414,220. By the end of fiscal 1951, Ryan revenues were higher than $2 million a month.

• **Revenue split** between airplane and metal products division was about the same proportionately as in the preced-

Only TAC has
perfected and produced
the open-end
ratchet
wrench!
Left: Crowfoot Type
Right: Socket Type
Four series of sockets cover 64 sizes from ¾" to 4". Crowfoot (fixed type) wrenches are also produced. All Details of our tools are protected by Patent numbers 2578686 and 2578687. Other Patents pending.
WRENCHING OPERATIONS on tubing, within aircraft assemblies where space is restricted, was a bottleneck before the TAC Open End Ratchet Wrench was introduced. Today this is the only tool used for certain critical jobs on tubing or other standing center connections.
The TAC will ratchet perfectly using as little as 7° arc. It slips down over tubing, tightens or backs off fittings, slips off again . . . all in a fraction of the time you'd expect.
Our plants are currently producing at capacity for all the Armed Forces and for Defense Industries.
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SUBSIDIARY OF
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ing year: 1950, airplane, $5,648,889, metal products, $6,863,962; 1951, airplane, $10,883,795, metal products, $11,393,380.

Carbon Copies of Router Patterns

Use of carbon paper is saving about 50 manhours a week at Texas Engineering & Mfg. Co., Inc., Dallas. New application for this duplicating technique is in making as many as 12 router patterns in a single layout operation.

Alternate sheets of pattern and carbon paper are stacked on a table and the pattern traced on the top sheet of the "lamination." Carbon paper employed is a heavy duty type and can be re-used several times.

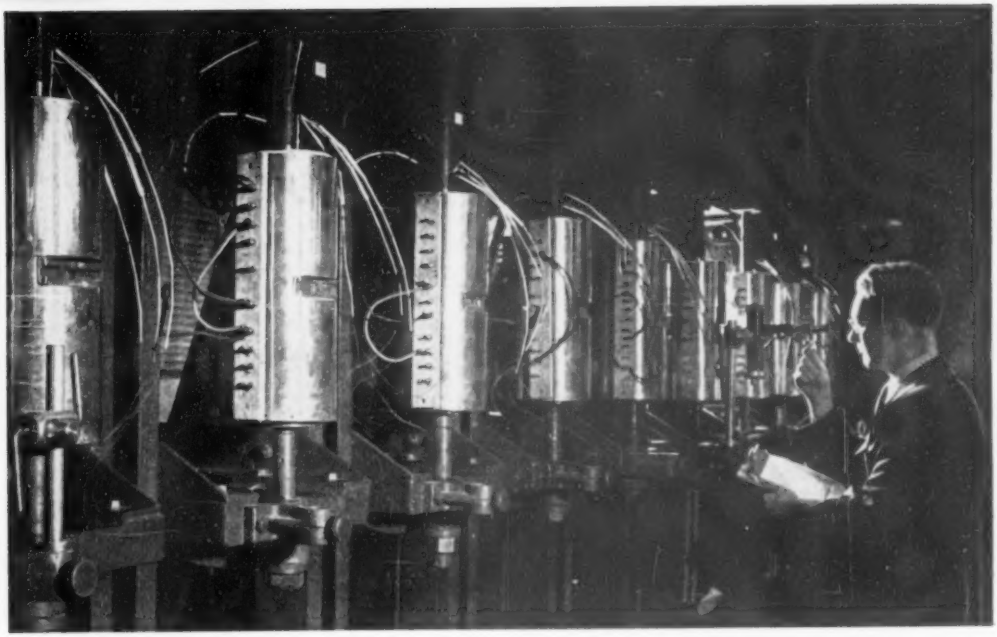
In addition to reducing layout time, Temco reports greater accuracy as a result of producing a number of patterns simultaneously.

Idea for the carbon paper technique came from Temco's J. C. Taylor in the company's sheet metal section.

This Stretchout Will Help Aviation

America's largest stretcher—a production machine for straightening aluminum extruded parts—has been designed and ordered by the Aluminum Company of America. Scheduled for installation at the company's Lafayette, Ind., extrusion works in about a year, the new stretcher will be capable of handling the large, one-piece aircraft parts now on the drawing boards.

The stretcher is a complementary machine to Alcoa's big, new, 13,200-ton extrusion press installed at Lafayette in January. This press extrudes aluminum parts beyond the straightening capacity of current equipment. But the new Alcoa stretcher will be able to handle these parts up to a maximum cross-section of 60 sq. in.



Where Metals Give Up Their Secrets

Suppose you want a metal to combat some particularly destructive set of service conditions.

Here's a man who can help you.

He's one of Inco's staff of engineering specialists and metallurgists. His primary responsibility is to determine how well a material qualifies for its intended use.

Often, he can find an answer to your problem among the metals and alloys he works with daily. He can tell you which of the Inco Nickel Alloys offers the most promising answer to your problem—and he can tell you just as frankly when a problem is outside the known scope of what the Inco Nickel Alloys can do.

Suppose, for example, you were caught in a predicament where you had to find a corrosion-resisting material with greater strength and hardness than you can get even in Monel®. He can name you an age-hardenable alloy that has the same excellent resistance as Monel *plus* mechanical properties you would expect to get only in a heat-treated alloy steel. Non-magnetic, too, down to −150° F. below zero. It is "K"® Monel, one of the Inco Nickel Alloys.

Maybe high temperatures complicate your problem. In that case he would study the service conditions and weigh out all the possible answers to your problem. Inconel "X"® is just one of a number of heat-resisting Inco Nickel Alloys that include Inconel®, the Nimonics, and the new Incoloy® — each one with different characteristics that make it best suited for different types of high temperature problems.

Remember this man. He can tell you where nickel alloys may safely be used to replace others containing even more critical metals. He can save you a lot of trial-and-error experimentation.

If you are wrestling with any problem that involves metals for aircraft use, let him lend a hand. There's no charge, no obligation. If one of the Inco Nickel Alloys cannot solve your problem, he may be able to recommend another metal that will. A note to "Technical Service" at this address will receive prompt attention:

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

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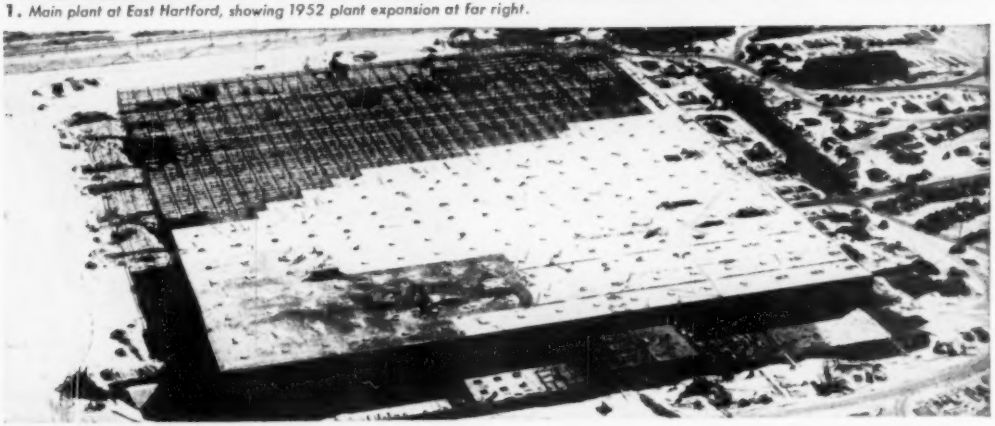
NICKEL (INCO) ALLOYS

MONEL® • "R"® MONEL • "K"® MONEL • "KR"® MONEL
"S"® MONEL • NICKEL • LOW CARBON NICKEL • DURANICKEL®
INCONEL® • INCONEL "X"® • INCOLOY® • NIMONICS

1. *Main plant at East Hartford, showing 1952 plant expansion at far right.*



2. *New North Haven plant, now under construction.*

3. *Reactivated government-owned plant at Southington.*

4. *Leased plant at Meriden.*

Aircraft Mobilizes!

More hard work lies ahead, but we are winning the battle to gain all-out production

IN THE months that followed the outbreak of war in Korea, Pratt & Whitney Aircraft has had to meet and solve an almost unbroken series of problems in expanding its production capacity to meet urgent requirements of National Defense.

These requirements called both for tremendous expansion in the production of existing piston and jet engines, and putting into large-scale production new and advanced jet engines of our own design.

In some of these cases we have had to work out manufacturing techniques unlike any we have ever used before. More of everything has been needed. We needed more floor space, more manpower, more materials and more machine tools. All of these things have been increasingly difficult to get.

But here is what has been done.

Within the last 12 months we have made provisions for almost 1,000,000 square feet of added company-owned manufacturing space. Our main plant in East Hartford will be larger by almost a third when we have expanded and occupied the present Hamilton Standard plant next door, and we are well along on the construction of a 500,000 square-foot plant at North Haven. In addition we have reactivated a large government-owned plant of more than 500,000 square feet at Southington, and leased a sizable plant at Meriden as well as several other smaller buildings. This will bring our total manufacturing space, excluding test cells and office areas, to about three and a half million square feet. Our employment has steadily gone up from 18,000 to some 26,000 people.

Throughout this period of readjustment, of tooling up, of new construction and of moving whole departments, we have somehow kept production rolling—and expanding. Beyond this, of course, we have made provision for additional output, both by expanding our system of subcontracting and by licensing Ford, Chrysler and Nash to build our engines.

There is still much to be done—but we are trying as hard as we know how to live up to our responsibilities to the defense effort.

Pratt & Whitney Aircraft

ONE OF THE FOUR DIVISIONS OF
UNITED AIRCRAFT CORPORATION

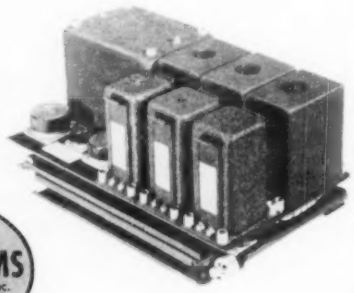
MAIN OFFICE AND PLANT: EAST HARTFORD, CONNECTICUT • BRANCH PLANTS: NORTH HAVEN, SOUTHINGTON AND MERIDEN

...simplified by "building block" electronic packages makes possible synthesis of present and future aircraft control systems.

Servomechanisms, Inc., has pioneered in developing functionally-packaged standard plug-in units for electronic and electromechanical aircraft instrumentation. Servomechanisms technique of MECHATRONICS...the multiple and interchangeable use of standard units achieves simplified control systems which solve the aircraft need for:

- Instant Maintainability
- Training Simplicity
- Spatial Adaptability
- Ease of Assembly

A typical Servomechanisms, Inc. control system showing the multiple combination of building blocks, each block easily removable and replaceable... simple to check and service.



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This Is An
OPPORTUNITY
For YOU

. . . to work in one of the most rapidly expanding companies in America, with an acknowledged need for its products in the defense of our country, but with an equal appeal for the untapped commercial market when the defense job is completed. Such a future presents a REAL OPPORTUNITY for advancement.

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TOOL DESIGNERS
— also —
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. with aircraft experience on Airframes, Controls, Electrical Installation & Power Plant Installation.

Also ENGINEERS For

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Scheduled 45 hr., 5 day week, premium pay for overtime, "the most liberal pension plan in the aircraft industry", group hospitalization, group insurance, paid vacations & holidays. Clean, modern, well lighted buildings in park-like surroundings only half-hour by car or train from center of Philadelphia. Railroad depot at plant entrance.

WRITE

. . giving detailed resume of experience and education to—

Engineering Personnel Manager

PIASECKI
Helicopter Corp.
Morton, Pa. Near Philadelphia

PRODUCTION BRIEFING

► **American Institute of Management**, New York, has awarded certificates of management excellence for 1951 to North American Aviation, Douglas Aircraft, Grumman Aircraft, Sperry Corp., and United Aircraft Corp. Ten corporate functions are judged and, in order to be certified by AIM, the firm must receive 7,500 out of a possible 10,000 points.

► **Greer Hydraulics, Inc.**, Brooklyn, N. Y., has completed an addition to its plant at 454 18th St. and is renovating the present building. This and leased space at 255 18th St. brings Greer's office and plant area to over 140,000 sq. ft. Greer employs more than 250 people in Brooklyn, plus sales and service personnel in several cities.

► **Luscombe Airplane Corp.**, Garland, Tex., plans to inaugurate a $450,000 building program adding more than 80% to the company's permanent building space. It is scheduled for completion by July 1. The new expansion will permit doubling Luscombe's present payroll of 800.

► **Norden Instruments, Inc.**, Milford, Conn., had 200 on payrolls Dec. 31. New Milford plant, expected to be in production in mid-1952, will employ some 500. Another facility at Bridgeport, Conn., covering some 20,000 sq. ft., will be readied for production early this year. Navy's BuOrd has given Norden a letter of intent to acquire about $2.3 million worth of machine tools and equipment, and the company is negotiating another facilities contract for tools for about $1.5 million.

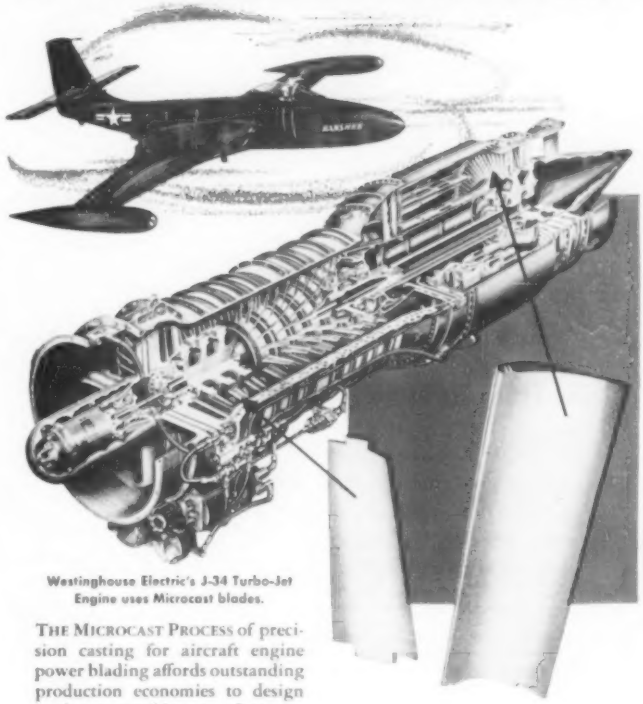
► **North American Aviation, Inc.**, has started output of modified wing assemblies for T-6 trainers at Hammer Field AFB, Fresno Air Terminal, Calif. Company has leased 22 buildings from the city of Fresno at the terminal and occupies 224,363 sq. ft.

► **Willys-Overland Motors, Inc.**, has placed its $14-million aluminum forging plant in operation in Erie, Pa., with the first 50,000 lb. of forgings being crossbeams and other landing gear sections for Fairchild C-119s. Plant has an estimated capacity of 15 million lb. of aluminum forgings annually.

► **Allison division**, General Motors Corp., has enlarged ramp space at Plant 10, also has installed three 10,000-gal. underground fuel tanks for servicing its test planes.

Microcast®

Power Blading Means Real Production Economies



Westinghouse Electric's J-34 Turbo-Jet Engine uses Microcast blades.

THE MICROCAST PROCESS of precision casting for aircraft engine power blading affords outstanding production economies to design engineers working on those remarkable new power systems. And the reasons for these savings over conventional methods are both unique and exclusive with the process. With Microcastings, you take advantage of the simplicity and inexpensiveness of tooling, avoid tool breakage. You effect substantial savings in expensive, critical alloys. Likewise, you effect man power savings and free equipment and floor space for other necessary operations. Perhaps the Microcast Process can solve some of your production problems; better investigate today!

FREE BOOKLET

on the precision process originated by Austenal Laboratories, Inc., for the production of castings of intricate design using the high melting point alloys where surface smoothness and dimensional uniformity are mandatory, requiring little or no machining. Write for booklet and information.

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– THE BETTER TO SERVE YOU

Pastushin Aviation's plant facilities are available for the production of aircraft fuel tanks, seats, landing flaps, ailerons, tail surfaces, bomb bay doors, aft fuselage sections, and other aircraft components.

Pastushin Aviation is equipped to produce detail parts and complete assemblies and can design and fabricate tools, jigs and fixtures. *Write Department B-18, 5651 West Century Boulevard, Los Angeles 45, California.*

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PASTUSHIN AVIATION CORPORATION

LOS ANGELES INTERNATIONAL AIRPORT, LOS ANGELES, CALIFORNIA

USAF CONTRACTS

Following is a list of recent USAF contracts announced by Air Materiel Command.

A. C. Spark Plug div., General Motors Corp., 1300 N. Dort Highway, Flint, Mich., cleaner, spark plug, 94 ea., $28,561.

Acme Telectronix, division of NEA Service, Inc., Cleveland, transceires, 9 ea., $82,316.

Aircraft Belt & Trim Corp., 2818 West Pico Blvd., Los Angeles, shoulder harness, $25,421.

Aeroproducts division, General Motors Corp., Dayton, propeller assemblies, exceeds $250,000; sub-assemblies & parts, $60,000.

Allison division, General Motors Corp., Indianapolis, spare parts, exceeds $250,000.

American Bosch Corp., 3664 Main St., Springfield, Mass., engine nozzles, exceeds $250,000.

American Fixture & Manufacturing Co., 4321 Semple Ave., St. Louis, stool, 3,000 ea., $30,720.

American Gas Accumulator Co., 1027 Newark Avenue, Elizabeth, N. J., runway lights, $45,063.

Bell Aircraft Corp., Niagara Falls, N. Y., spares, $50,000.

Bendix Products division, Bendix Aviation Corp., South Bend, Indiana, spare parts, $49,825; aircraft material, $153,186; spare parts, exceeds $250,000.

Busch Camera Corp., 500 S. Clinton St., Chicago, holder, 11,000 ea., $25,850.

Colonial Radio & Television div., Sylvania Electric Products, Inc., 254 Rano Street, Buffalo, N. Y., receiver, exceeds $250,000.

Douglas Aircraft Co., Inc., Santa Monica, Calif., spares, exceeds $250,000.

Eclipse-Pioneer division, Bendix Aviation Corp., Teterboro, N. J., airspeed assembly, $82,041.

Elastic Stop Nut Corp. of America, 2330 Vauxhall Road, Union, N. J., aircraft hardware, $34,745.

Fairchild Aircraft division, Hagerstown, Md., spares, exceeds $250,000.

Farrand Optical Co., Inc., Bronx Blvd., & E. 238th St., New York, spare parts, $39,848.

Fisher Body div., General Motors Corp., Grand Rapids, Mich., aft fuselage assemblies, exceeds $250,000.

Foley Manufacturing Co., 3300 Fifth St., N. E., Minneapolis, filer—saw, 77 ea., $34,189.

General Electric Co., Schenectady, N. Y., spare parts, exceeds $250,000.

Gould-National Batteries, Inc., Depew, N. Y., batteries, 4,972 ea., $200,390.

Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst, N. Y., indicators, $181,405.

Miller Steel Co., Inc., 1221 South Plate St., Kokomo, Ind., sheet steel, 700,000 lb., $68,935.

National Lock Co., 1902 Seventh St., Rockford, Ill., aircraft bolts, $86,459.

North American Aviation, Inc., Port Columbus, O., assemblies, $26,037.

North American Aviation, Inc., Columbus, O., kits, $87,272.

Northrop Aircraft, Inc., Hawthorne, Calif., spare parts, exceeds $250,000.

Pesco Products div., Borg-Warner Corp., 24700 North Miles Rd., Bedford, O., maintenance parts, $105,328; maintenance parts, $220,878.

Phaostron Co., South Pasadena, Calif., generator relays, 1,359 ea., $64,318.

L. Power and Co., 2815 Oakford St., Philadelphia, band saws, 50 ea., $75,350.

Propeller division, Curtiss-Wright Corp., Caldwell, N. J., propeller assemblies, exceeds $250,000.

W. J. Savage Co., Inc., Knoxville, Tenn., nibbling machines, 30 ea., $42,985.

Ternstedt div., General Motors Corp., 6307 W. Fort St., Detroit, indicator, exceeds $250,000.

Thompson Products Inc., 23555 Euclid Ave., Cleveland, seal, $37,756; shaft seal, $18,317.

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LAS Overhaul Backlog Totals $25 Million

• Lockheed's bases handle wide variety of jobs.

• And rebuilding a broken Connie is one of them.

By George L. Christian

Burbank, Calif.—Aircraft overhaul and modification companies have built-in problems as a result of their split personalities.

• **The overhaul side** has to cope with large varieties of aircraft and all their hundreds of components—but in small quantity—and with little or no advance warning as to the jobs coming into the shop.

• **The modification branch** has the reverse problem—large numbers of aircraft come through for a standard modification. To make matters tougher, an assembly line may have to be changed from a piston-engine World War II fighter line to a modern jet aircraft setup almost overnight.

But despite the headaches, the work can be financially rewarding. Lockheed Aircraft Service, for instance, with centers in California and New York, now has a sizable backlog of over $25 million. The Burbank headquarters contributes $22,155,000 to this figure; LAS International at Idlewild has a backlog of $3.5 million.

► **Running the Gamut**—Lockheed handles a variety from Piper Cubs to B-36s at its two bases.

• **At Burbank**, where 54% of the work was modification, 44% overhaul and maintenance (small portion was line maintenance), and 2% tank sealing, the company accomplished over 3 million work hours on 543 aircraft of 12 different types.

• **In New York**, Lockheed Aircraft Service—International, whose home is in a large hangar at New York International Airport, is strong on overhaul, and therefore variety. Its staff worked 591,000 hours on 947 aircraft of 21 different types. Approximately 80% of the labor was overhaul and maintenance (airline operations pushed LASI's line maintenance percentage well over Burbank's); 15% concerned modification and conversion, and 5% tank sealing.

Burbank runs heavily towards military aircraft of many types. Among the craft moving through its shops are large quantities of F-80s acquiring cameras in their modified noses to become RF-80s. Other F-80s and F-33s roll through inspection, modification, intermediate and major services.

P2V Neptunes may be seen on the ramp having their sleek sides modified to latest Navy standards. In some cases, huge metal skis replace wheels and are faired into nacelle and nose wheel well.

Still other Lockheed Aircraft Corp. products at LAS are military Constellations for intermediate services and inspection or major overhaul and modifications, and Model 12s and 18s.

Other aircraft using LAS this past year included C-97s, DC-6s, DC-4s, DC-3s, A-26s, F-51s and Grumman Widgeons. LAS also demothballed B-29s at Pyote, Tex.

At the LAS Idlewild base, Connies (including ten Connies from MATS) step in for anything from a quick turnaround inspection to a major reconstruction job. But airline Douglas DC-4s and DC-6s are frequent visitors. Airlines consistently using LASI's Idlewild facilities include Seaboard and Western, Lineas Argentinas, Linee Aeree Italiane, El Al and Aramco.

LASI also performs miscellaneous work on a variety of aircraft including Bell helicopters, B-29s, C-97s, PBYs, F-84s, Beech C-18s and Ryan Navions.

► **Fix 'em & Fly 'em**—An LAS official told AVIATION WEEK: "We get all the tough jobs. When an outfit gets into trouble, they come to us. . . . We fix 'em and fly 'em." He was not complaining, just pointing up some of the headaches of his type of operation. He enumerated some other typical posers:

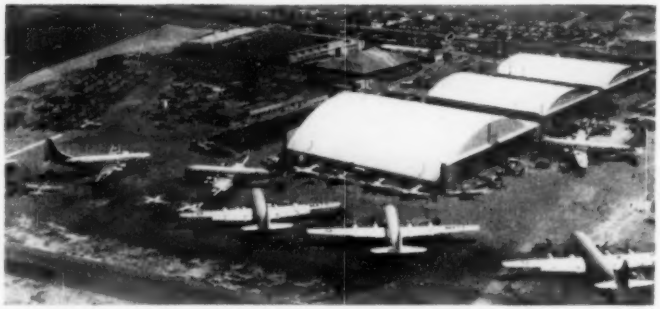
• **Difficulty of handling** a large variety of aircraft and engines and having adequate stocks of spare parts.

• **Planning for the future** was, in many instances, a crystal ball-gazing job—never knowing what was coming next.

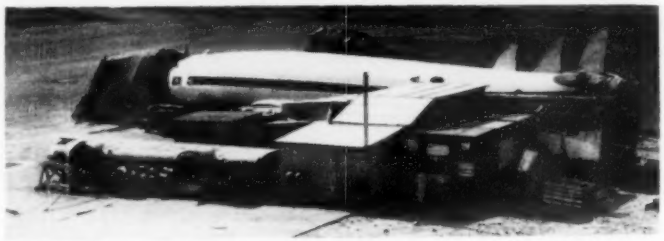
• **Training personnel** had its problems. Just as a group of men become accustomed to one type of airframe, engine or routine, chances are they will be transferred to a totally different job.

• **Variety of customers** compounds the company's worries. Customers include the military services, government agencies, airlines, executive aircraft owners and individual plane owners.

► **In the Works**—Sample special jobs



RAPIDLY expanding Burbank base uses tent (center background) for overflow work, and . . .

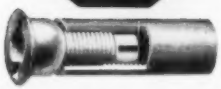


OUTDOOR station was set up to repair wrecked Connie as space saver at Idlewild.

DILL LOK-SKRU

THE BLIND ANCHOR NUT OR/RIVET

ONE MAN INSTALLATION IN SECONDS



THE AVIATION STANDARD
for Screw Locking Anchor Nut Uses and Metal to Metal Fastening.

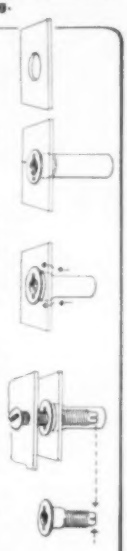
1 Drill one (1) hole.

2 Insert Lok-Skru with either Hand or Power Lok-Skru Tool.

3 With Lok-Skru Tool draw barrel over shoulder of Lok-Skru and flush with metal. This provides a Blind Anchor Nut for Secondary Attachments.

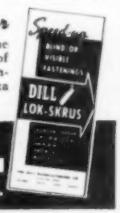
4 TO FASTEN ATTACHMENTS insert standard Machine Screw through hole in attachment and into Lok-Skru. As machine screw is tightened into Lok-Skru it is securely locked by means of the "Specially Crimped" locking-end of the Lok-Skru.

Crimped internal threads of Lok-Skru provide secure locking device for attachment screw.



Write for Folder

Handy information on the many uses and application of Lok-Skrus in airplane construction with complete data on types and sizes.



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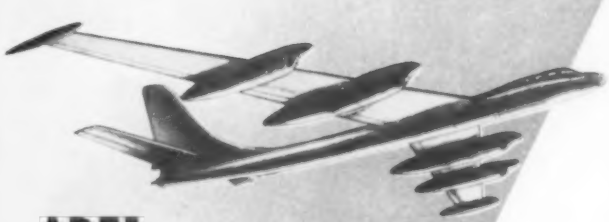

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AIRCRAFT HYDRAULIC CONTROL EQUIPMENT FOR EVERY APPLICATION!

WHATEVER your requirements, ADEL is the one manufacturer able to furnish aircraft hydraulic control equipment for every application. And from this complete ADEL line of controls you gain three distinct advantages.

You get first of all, unprejudiced recommendations about the control equipment best suited to your needs. You gain the benefit of ADEL'S fourteen years experience in all phases of hydraulic control. Finally, you can standardize on one source for all your aircraft hydraulic control equipment. This places full responsibility with one company.

Beyond these advantages of the only complete product line are ADEL'S comprehensive facilities for service, ingenuity in design development and engineering as well as precision and efficiency in manufacturing. So standardize on ADEL—the leader in completeness of line, service and dependable performance.

ADEL also manufactures a complete line of fuel heater and anti-icing accessories, and clips and line supports.

ADEL DIVISION, GENERAL METALS CORPORATION,
10775 Van Owen Street, Burbank, California.

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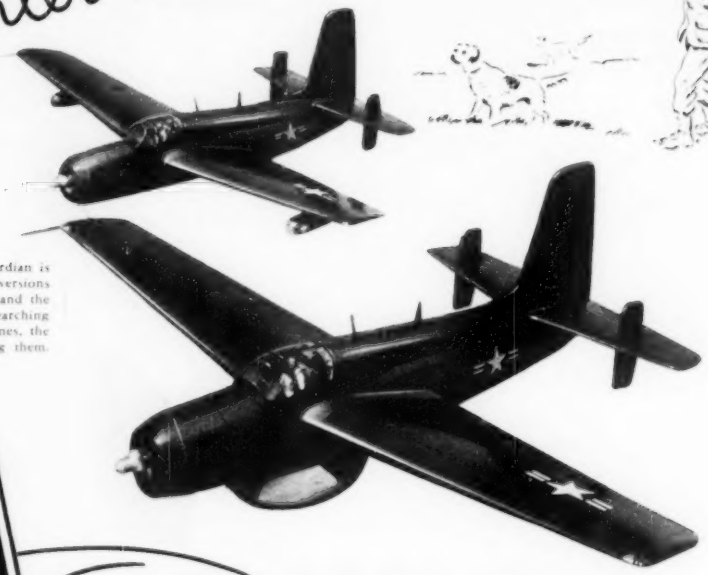
GRUMMAN'S

"Hunter-Killer Team"



The Grumman Guardian is produced in the two versions shown, the AF-2W and the AF-2S — one for searching out enemy submarines, the other for destroying them.

BARBER COLMAN

"TEAMS UP" WITH GRUMMAN TO PROVIDE

CABIN TEMPERATURE CONTROL

Through close cooperation with the designers and builders of the Grumman Guardian, Barber-Colman engineers developed for this aircraft a cabin temperature control system that is outstanding in performance, light weight, and reliability under all flight conditions.

A POSITIVE, ALWAYS-RELIABLE HEATER CYCLING SYSTEM

The heart of the Barber-Colman temperature control system is a resistance bridge containing temperature-sensitive thermistors and a Micropositioner* polarized relay for energizing the cycling relay that governs the heater circuits. The bridge continuously senses cabin temperature, heater temperature, and outside temperature — then automatically adjusts the heater cycling frequency to maintain the cabin at desired comfort conditions. Thus the Grumman "Hunter-Killer Team" is assured of continuous, automatic, accurate team-work by the Barber-Colman temperature control equipment, to protect the pilots from blasts of heat or cold that could make their vital work more difficult.

*Reg. U.S. Pat. Off.

LIGHT-WEIGHT CONTROLS

Equipment as used in the Grumman Guardian weighs only 3 lbs. 7 oz. for *all* the control instruments, including Cabin Selector Rheostat, Cabin Sensing Element, Outside Ambient Sensing Element, Heater Discharge Element, Duct High Limit Thermostat, and the Control Box.

ONLY 3 lbs. 7 oz.!

BARBER-COLMAN

for Any Control Requirement

On-Off Controls
Floating Controls
True Proportioning Control

There are many outstanding and distinctive control systems available by suitable combinations of the versatile line of efficient Barber-Colman equipment, each designed for the conditions of specific application.

BARBER-COLMAN COMPANY, 1252 Rock St., Rockford, Ill.

Representatives in Los Angeles, Seattle, Chicago, Baltimore, Newark, Montreal

LOCKHEED is converting six A-26s (left) to transports for oil firms and five BOAC Connie interiors to the 3-2 seating arrangement (right).

currently in Lockheed's ballwick are:

• **Coach conversion** of five British Overseas Airways' Model 049 Constellations is underway at LAS. This program entails such major undertakings as replacing the entire interior, changing 2 = 2 seating to 3 = 2 seating, completely modifying the air conditioning and pressurization system (Western Gear replaced by Stratos cabin superchargers for greater capacity dictated by upping passenger load to 70 passengers), and installing Model 749-type toilets in place of 049 variety. Other work includes selective fuel tank stripping and rescaling, installation of a completely new galley with centralized galley switches, and latest electric ovens.

A new public address system is being installed which includes five high-fidelity loud speakers in the overhead panel and hand microphones for flight deck and hostess.

Because of the increased passenger capacity, BOAC is having two additional emergency exits installed.

LAS spokesmen estimate that three of the BOAC Connies will be out of the shop by April.

• **Constellation resurrection.** A BOAC Connie was broken during a landing accident in England some time ago. It was recently purchased and shipped to LASI, Idlewild, for "repair." LASI says this is probably the most extensive job ever done to return a Connie to airworthy condition.

To do such extensive rehabilitation in the hangar would have tied up valuable space for too long; estimated duration was 29 weeks. So LASI officials decided to put the plane back on its landing gear by doing the work on the apron. Work is under the direct supervision of Jack Lee. To protect against the rigors of a Long Island winter, temporary shacks were knocked together around the nose and main

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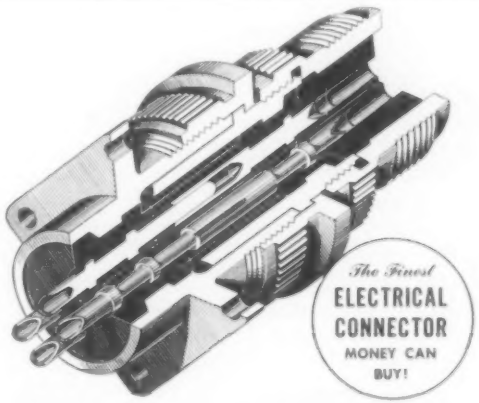
When operating conditions demand an electrical connector that will stand up under the most rugged requirements, always choose Bendix Scinflex Electrical Connectors. The insert material, an exclusive Bendix development, is one of our contributions to the electrical connector industry. The dielectric strength remains well above requirements within the temperature range of −67°F to +275°F. It makes possible a design increasing resistance to flashover and creepage. It withstands maximum conditions of current and voltage without breakdown. But that is only part of the story. It's also the reason why they are vibration-proof and moisture-proof. So, naturally, it pays to specify Bendix Scinflex Connectors and get this extra protection. Our sales department will be glad to furnish complete information on request.



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ELECTRICAL CONNECTORS

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• Moisture-Proof • Radio Quiet • Single Piece Inserts • Vibration-Proof • Light Weight • High Insulation Resistance • High Resistance to Fuels and Oils • Fungus Resistant • Easy Assembly and Disassembly • Fewer Parts than any other Connector • No additional solder required.

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And it has taken years of continuously maintained quality to make Amphenol the keyword of the electronics industry. The long list of manufacturers specifying Amphenol in the production of equipment for military aircraft coincides with the list of those who are best known in the field of aircraft development.

The strain of super-sonic and near super-sonic speeds, extreme variations in temperatures and the sudden stress of combat maneuvers mean that anything less than top quality will result in failure. Amphenol's engineers are not even satisfied with meeting the present rigid Army-Navy Specifications. Production samples are continually being "tortured" in Amphenol's extensive testing laboratories in a program of improvement on the present high standards.

Specifying Amphenol cables and connectors is your positive assurance that the electronic components in your equipment will not fail!

Your copy of General Catalog B-2, which contains the complete Amphenol line of manufacture, will be sent on request.

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cabin entrance door. Portable heaters keep the interior at comfortable temperatures. Other components, such as wing and empennage, are being worked on in the open.

This reborn Connie (#1,980), is taking on international aspects. Since certain assemblies were damaged beyond the state of reasonable repair, they were replaced with sections from Constellation #1,966, purchased from Air France.

This is how the hybrid Connie will shape up when it takes to its wings again:

- From fuselage station 110 (nose) to sta. 205, homemade by LASI, using part of basic structure that was in good condition.
- Sta. 205 to sta. 260, mostly Air France #1,966 with these exceptions: BOAC's sta. 260 left-hand bulkhead was still in good condition, so it was reused and spliced into the fuselage to avoid necessity of disturbing routing of large radio wire looms through this bulkhead; right 260 bulkhead was Air France's—to cut down on manhours "some 375 electric wires routed through this side to the flight engineer's panel were suitably identified and cut on a stagger for ease of splicing and ringing out circuits when installation is complete"; windshield assembly and upper cockpit canopy will be from the original #1,980.
- Lower fuselage section from sta. 260 to sta. 333 belonged to Air France. Rest of the fuselage is BOAC's #1980.
- Entire wing is original except for the left-hand inner section which came from Air France. The entire secondary structure section of this portion required rebuilding. Simultaneously, the modification raising the gross weight to 96,000 lb. was included.

LASI assures the complete airworthiness of the Connie which will be delivered as a zero-time aircraft.

▶ **Rearward Seating**—LAS officials told AVIATION WEEK that their company was the first in the U. S. to make permanent rearward-facing seat installations in military aircraft. Modification of the floor structure and installation of the floor fittings on MATS Boeing C-97s were done at LAS. A total of 20 C-97s, accommodating 60 passengers each are so arranged.

Background of this installation goes back to 1946 when MAT's forerunner, the Air Transport Command, conducted evaluation flights with rearward-facing seats on transcontinental C-54 flights.

A poll of 1,020 high priority passengers revealed that 959 favored reversed seating, 45 objected and 16 had no comment. Of the 1,020, 835 rode backward for the first time.

Asked whether they favored permanent rearward seating, 896 said "yes";

85 "no"; and 39 were noncommital.

Position of the seat is important. LAS quotes a military finding: "Evidence from crash landings of military aircraft has shown that the position of the passenger in the aircraft is an important factor in survival. An analysis of casualties and fatalities in 20 crash landings of B-24-type aircraft showed that persons in the rear (waist) are seven times less likely to die, three times less likely to have serious injuries and three times more likely to have no injury than those forward of the leading edge of the wing.

"It may be advantageous, therefore, to place passengers as far rearward as possible."

▶ **Analyzer Installation**—LASI projects, under Chief Engineer Neil Thomas, have been to place both Scintilla and Sperry analyzers into four-engine aircraft. Working under a subcontract from Scintilla, LASI has engineered installations of their ignition analyzer for the B-29, C-54 and Model 749 Constellation, according to Thomas.

KLM, Royal Dutch Airlines, has at least one installation on a 749. The neat arrangement includes a vertically mounted scope to the left of the flight engineer directly behind the co-pilot's seat, where it can be seen at a glance. The switch panel assembly is recessed in the flight engineer's table, covered with a hinged, flush-mounted cover which gives the crew member a flat working surface when not manipulating the analyzer's controls.

The Sperry engine analyzer installation was engineered for MATS' 10 C-121 Constellations. The analyzers are the D-5 model, with complete engine vibration analysis, one pick-up per cylinder. (Wright Aero had to machine away portions of the cooling fins of the engines to permit individual cylinder pickups.)

The compact arrangement around the flight engineer's panel includes the scope flush-mounted in the engineer's table. It is covered with a Plexiglas cover to provide smooth working space. Three control switches are installed one above the other on the 260 panel—from top to bottom: cycle switch, condition switch and vibration pick-up selector switch.

School Established

The Aviation Engineering Corp., Woodside, L. I., N. Y., has established a service school devoted to field servicing of electronic fuel gages, calibration procedures, inspection methods and basic theories of operation of the newest Avien fuel gaging and controlling devices. Courses are on a monthly basis, according to Aviation Engineering.

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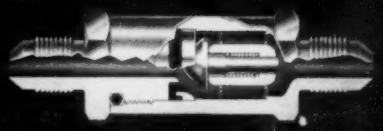
LEAKAGE ZERO



ACTUAL SIZE

Cornelius AIR-CHECK VALVES

Illustration shows streamlined, "straight through" design which assures uninterrupted, free flow of air. Cornelius Air Check Valves have high flow capacity with minimum pressure drop.

Leakage Zero up to 4500 PSI.

Working Pressure 3000 PSI.

Proof Pressure 4500 PSI.

Burst Pressure 7500 PSI.

Weight 0.07 lb. aluminum. 0.16 lb. stainless steel (material optional).

Ports per AND10056 for ¼" tube. Other sizes and ports per AND10050 available.

Temperature range −65° to +300°F.

Performance features such as leakage zero—"straight through," uninterrupted airflow—dependable service under icing conditions make the Cornelius Air Check Valve an outstanding unit designed specifically for pneumatic service.

Let us help you with your pneumatic system developments. Contact or write us for specific information.

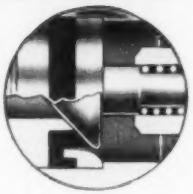


Illustration shows position of poppet under high differential pressure condition. Note the metal to metal seal as well as the rubber seal.

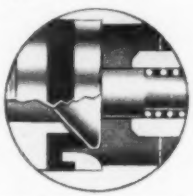


Illustration shows position of poppet under low differential pressure condition. Streamlined poppet and rubber seat provide a positive leaktight seal with differential pressures as low as 0.5 PSI.

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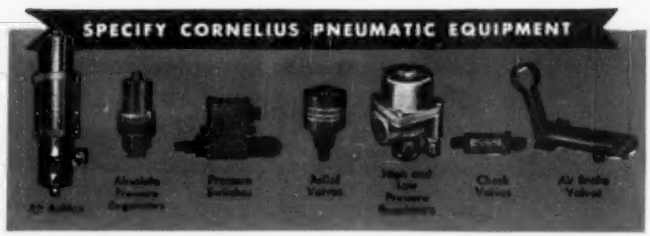
SPECIFY CORNELIUS PNEUMATIC EQUIPMENT



Tiny Slip-Ring Assemblies

A line of subminiature slip-ring assemblies for use in miniature motors, synchros, or other rotating devices, has been developed by the Naer Corp. The units are available with silver, gold, or platinum rings.

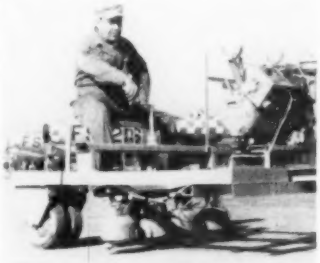
The rings are molded with a special compound having a tensile strength of 4,000 to 4,500 psi. and Rockwell Hardness (M Scale) of 27.0, according to the manufacturer. Heat distortion temperature is said to be 225F or higher. The manufacturer also says the slip-rings will withstand 1,000 volts.

Naer Corp., 631 South Sepulveda Blvd., West Los Angeles 49, Calif.

Maintenance to Zep

Maintenance of all experimental and production oxygen flight test equipment used by Boeing, Convair, Douglas, Lockheed, North American and Northrop airframe companies has been assigned to Zep Aero Breathing Equipment Co., the Los Angeles firm announces.

Zep says it also has been awarded a contract to overhaul all oxygen equipment, including regulators, cylinders and valves, on B-36 aircraft now being modified at Convair, San Diego.

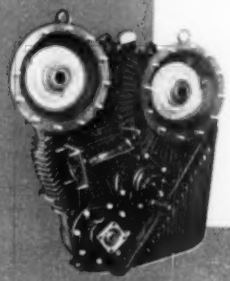


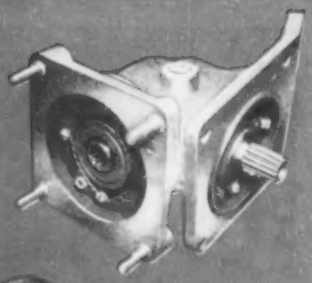
CLEANING UP AT AIR BASES Here are two ramp cleaners used by USAF to pick up nails and other metal litter from ramps and aircraft parking areas, where they raise hob with airplane tires. The small sweeper mounting four electromagnets is in use at Neubiberg Air Base; the six-by-six generator truck tidies up Wiesbaden Air Base. Both bases are in Germany.

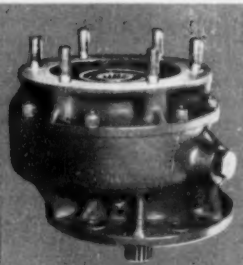
HEADQUARTERS

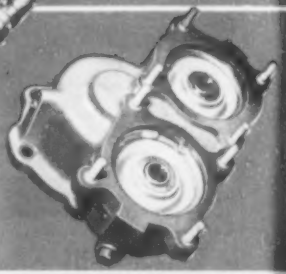
FOR

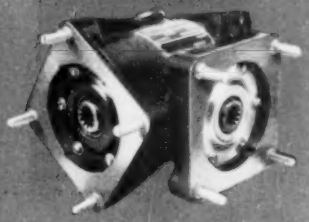
AIRCRAFT ACCESSORY DRIVES

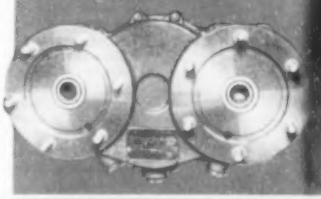


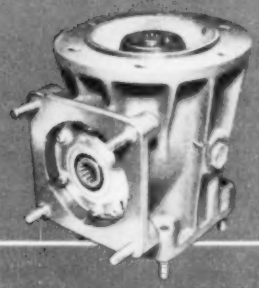


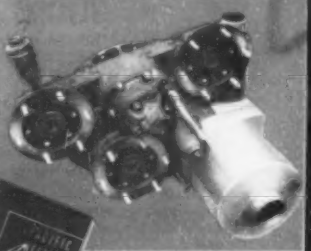












Design
Development
Prototype Production
Quantity Production

Just a few of the many drives produced by Western Gear Works for aircraft-engine accessories are illustrated on this page.

GEAR DRIVES by WESTERN GEAR

ENGINEERS...

Western Gear provides engineering and production on all types of gear drives and gear products for airborne or ground use in the aircraft industry. Send for Aircraft Actuator Bulletin #4811, or Aircraft Equipment Bulletin #4801, or both, on your company letterhead.

5210

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(Los Angeles County)
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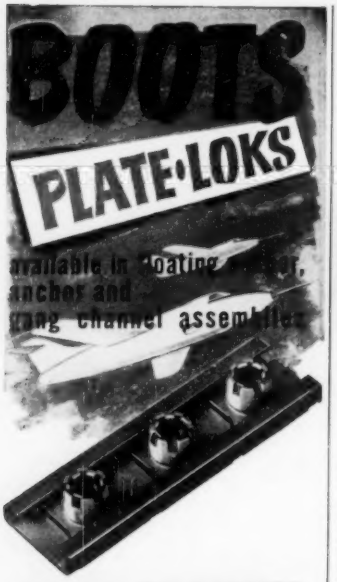
2800 E. Imperial Highway, Lynwood (Los Angeles County), California
1601 Folsom St., San Francisco 3, Calif.
Belmont (San Francisco Peninsula), California
117 N. Palmer St., Houston, Texas
Representatives • 830 S. W. Oak St., Portland 14, Oregon
1124 Champa Street, Denver, Colorado
Engineering & Machinery Ltd., 1504 W. Broadway, Vancouver, B. C.



GANG CHANNEL

The unique Plate-Lok Nut assembled into straight channels; removable or permanently attached nuts. Standard-length channels in a wide range of nut spacings are available; special lengths and spacings can be supplied to your order.

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Plate-Loks in anchor bases to meet your every requirement—plain anchors, one-lug, corner, midget, right-angle. The all metal Plate-Lok is fully approved under AN-N-5 and AN-N-10. Its positive locking action is proof against vibration and structural breakdown due to radical temperature changes.

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Now in one-lug, two-lug, and right-angle bases—for regular or countersunk rivets, for welding—permanently assembled or with removable nuts. For anchor applications where float is desirable—specify Plate-Lok!

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Tell us about your lock-nut problems. We'll supply experimental quantities free.
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BOOTS

Boots Aircraft Nut Corp.
STAMFORD, CONNECTICUT

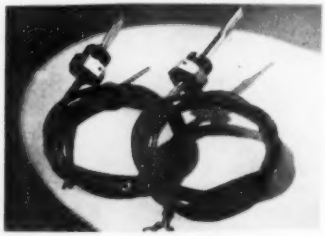
NEW AVIATION PRODUCTS

Sealer Smooths B-47

An aerodynamic smoother being used to boost the speed of the B-47 Stratojet bomber, was made available recently by the Minnesota Mining and Mfg. Co.

It is a paste and is applied with a putty knife to depressions around rivets, joints and other irregularities on the skin surface that might slow up the plane. The product, 3M Sealer EC-967, is described as a "tough, flexible, rubber-like solid." After being spread on, it is allowed to set, then trimmed off smooth and flush with the surface, by sanding. The company says it has excellent weathering characteristics, possesses good adhesion to metal, is resistant to all common servicing fluids, performs well over a wide temperature range (—65 to 225F) and may be painted.

Adhesives and Coatings division, Minnesota Mining & Mfg. Co., 411 Piquette Ave., Detroit 2, Mich.



Sensitive Pickups

"Type 21," a new series of temperature pickups, said to have an exceptionally short thermal time constant (less than one sec. in water) and high voltage output, has been announced by Trans-Sonics, Inc.

Available in several ranges going up as high as 1832F, the pickups are believed by the firm to be ideal for telemetering, recording and remote indication of liquid and gas temperatures. They are designed for an accuracy of ±1% of full scale and carry a sensing element within a spade-shaped stainless steel, inconel or other metal case, as required.

The pickups can be used to follow very rapid thermal transients and their output impedance is low enough to permit use of a step-up transformer to raise voltage ten or 20 times. Control of telemetering channel inputs is possible without intermediate amplification.

The thermometers also may be used to actuate milliammeters and sensitive relays directly.

Trans-Sonics, Inc., Bedford Airport, Bedford, Mass.

Templates Faster

A giant vacuum printing frame designed to cut costs and speed turn out of metal templates by eliminating hand layout methods, has been developed by Miller-Trojan Co.

The machine uses a simple photographic process to reproduce the template design on the metal surface, avoiding the labor and time involved in drawing in lines manually. An automatic timer permits unsupervised exposures from one second to several minutes. The overall printing area of the machine is 68 × 144 in. It uses heavy gage, heat-treated glass to keep breakage problems down.

The printing frame can be used continuously without overheating, its side and bottom reflectors providing thorough, even illumination with no "hot spots," the company explains.

Quick, even exposure is provided by a bank of instant start, slim line fluorescent tubes.

Miller-Trojan Co., Inc., 1083 W. Main St., Troy, Ohio.

Jet Blade Cutter

Special cutters for milling the airfoil form of stainless steel jet compressor blades have been developed by the Continental Tool Works division of Ex-Cell-O Corp.

The cutters, carbide tipped, use a grade of carbide "that has proved best in long production runs," says the firm. They are described as rugged enough to make heavy cuts into the tough material used for compressor blades, a particularly important feature in machining stainless steel. Unless substantial cuts are made when the cutting

tool is in contact with this material, glazing or rubbing may result and the metal will become work hardened, Ex-Cell-O explains. The firm is a leader in development of large, specialized automatic grinding machines for work on jet components.

Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.

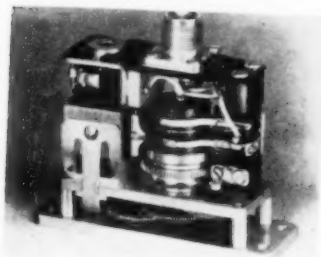
High-Temp Grease

A new grease, reportedly exhibiting qualities exceeding established military and aircraft industry standards, has been developed by Texaco.

The product is finding use in engine-driven accessories particularly those exposed to engine heat, in landing wheel bearings and other applications in aircraft. It provides "unusual protection" in continuous service at temperatures from —20F all the way up to 300F and is suitable for intermittent operation at 350F, according to the company. The grease is said to give excellent oxidation resistance.

Tests also have shown it gives exceptional service at very high speeds and that its resistance to water makes it suitable for applications where long retention is desirable and washing out is a problem.

The Texas Co., 132 E. 42 St., New York.



Times Jet Igniters

An adjustable timer, operating off d.c. current and designed to control operation of a wide variety of aircraft components, has been introduced by Bendix.

The device can be used to limit or sequence operating cycles of jet engine igniters, or to sequence or limit operation of solenoid valves and other equipment. It protects components whose "on time" must be controlled for safety reasons or to prevent failure.

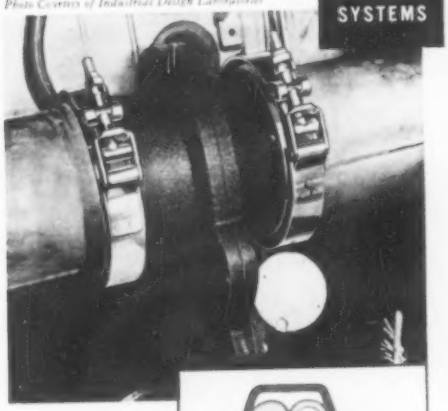
The timer, adjustable for timing cycles from a few seconds to several minutes, is driven by a conventional shunt-wound motor. The unit resets itself instantly on interruption of current to a holding coil.

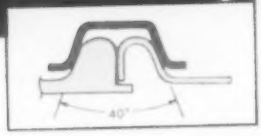
Pacific division, Bendix Aviation Corp., N. Hollywood, Calif.

ENGINEERS NOTEBOOK

HEATING SYSTEMS

Photo Courtesy of Industrial Design Laboratories





MARMAN

V-Bands and integral welded flanges simplify duct coupling on Globemaster

An ideal arrangement for coupling iris control valve in by-pass heating duct of the Douglas C-124 Globemaster II is achieved with a standard Marman V-Band Coupling and integral welded flanges. This is but one example of many diversified applications where standard Marman couplings and flanges provide the right combination of strength, light weight and positive seal, plus production and maintenance advantages of the patented "Quick Coupler Latch."

Save Cost, Time and Weight with Marman

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Technical Service Data Sheet

Subject: PROTECTING FRICTION SURFACES WITH THERMOIL GRANODINE®

INTRODUCTION

Fabricators and product designers, particularly in the automotive field, are aware that even highly polished surfaces under friction weld, gall and score. One of the most inexpensive and practical methods of preventing this is to coat the metal to prevent metal-to-metal contact. With cast iron or steel, the "Thermoil-Granodine" manganese-iron phosphate coating provides a wear-resistant layer of unusual effectiveness.

Thermoil-Granodizing greatly prolongs the life of parts subject to friction. It protects the surface of products like the diesel engine liners shown above and the many moving parts of automobiles and other machines. "Thermoil-Granodine" with its remarkable lubricating properties is particularly valuable in these and similar applications because of its ability to retain oil and maintain lubrication under high pressures and high velocities. This ACP wear proofing chemical not only permits rapid break-in without scoring, scuffing and welding but also reduces subsequent wear on friction parts.

"THERMOIL-GRANODINE" PROTECTS RUBBING PARTS

Thermoil-Granodizing removes "fuzz" from ferrous metal friction surfaces and produces a coating of non-metallic, water-insoluble manganese-iron phosphate crystals which soak up and hold oil as bare untreated metal cannot do. The oiled crystalline "Thermoil-Granodine" coating on piston rings, pistons, cylinders, cylinder liners, cranks, cam-shafts, gears, tappets, valves, spiders and other rubbing parts, allows safe break-in operation, eliminates metal-to-metal contact, maintains lubrication and reduces the danger of scuffing, scoring, welding, galling and tearing of the metal. The work to be protectively treated is merely Thermoil-Granodized and oiled, usually with a soluble oil.

"THERMOIL-GRANODINE" MEETS THESE SPECIFICATIONS

SPECIFICATION NUMBER	SPECIFICATION TITLE
MIL-C-16232 Type I	Coatings — phosphate; oiled, slushed, or waxed (for ferrous metal surfaces) and phosphate treating compounds.
AN-F-20 (See also U.S.A. 3-213)	Finishes, for electronic equipment.
U.S.A. 57-0-2C Type II, Class A	Finishes, protective, for iron and steel parts.
U.S.A. 51-70-1 Finish 22.02, Class A	Painting and finishing of fire control instruments; general specification for
M-364	Navy aeronautical process specification for compound phosphate rust-proofing process.

CHEMICALS ACP PROCESSES

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CHEMICALS ACP PROCESSES

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FINANCIAL

Airlines Plan New Stock Issues

Healthy trend toward normal private financing cited; United, TWA, Continental, Pioneer plan flotations.

A new wave of public financing is developing for the airlines. The amount of new capital flotations promises to be the largest since 1946-1947 when a total of more than $60 million in preferred stock and about $16.5 million in year period was the all-time high for common shares were sold. That two-public financing.

United, Trans World, Continental and Pioneer Air Lines have projected stock financing plans thus far. Other carriers are likely to follow before long.

United has the largest proposed financing with a total of about 224,000 shares of cumulative convertible $100 par value preferred ticketed for sale. This will be done through the offering of rights to common shareholders at the rate of one share of preferred for each 11 shares of common. At least $22,400,000, probable more, should be raised in this manner.

United recently forced conversion of its preferred by calling the entire remaining issue for redemption. At the date of the call, some 36,000 shares of 4½% preferred were outstanding and convertible at the rate of 4.219 shares of common for each share of preferred. Rather than accepting the call price of $102.50 per share for the preferred by Mar. 18, holders could obtain the equivalent of about $125 per preferred share at present market prices through the conversion route.

▶**Capital Structure**—Exact number of new preferred shares to be marketed will be determined Mar. 19. The conversion rate on the new shares also will be indicated at about the same time. As of Feb. 26, 1952, United had 2,383,363 shares of common and 19,334 of the old preferred outstanding. The rest of the capitol structure now consists of $8,400,000 in 2% term bank loans, $11,088,000 of 3½% Series A debentures due in 1967, and $10 million of 3½% Series B debentures also due in 1967.

Proceeds of the new financing, which is to be underwritten by Harriman, Ripley & Co., will be applied toward payment in 1952-53 of new flight and related equipment costing approximately $47,158,000. Included is around $36,370,000 for 14 DC-6Bs and 40 Convair 340s, another $8,017,000 for engines and other flight equipment, and about $2,771,000 for additional ground facilities.

To supplement its financial requirements, United also had a $16 million standby bank credit agreement, good until July 1, 1952. Depreciation throw-offs and normal earning power also are expected to generate a substantial source of new funds for new capital demands.

▶**TWA Plans**—Trans World Airlines previously announced its intention to seek $5 million through the sale of additional stock to its shareholders. Under supplemental agreements with the Equitable Life Assurance Society of the U. S., holder of the airline's debentures, the company had agreed to raise $5 million in additional equity in 1951 and an equal amount in 1952. The 1951 requirement is planned for fulfillment with the proposed offering.

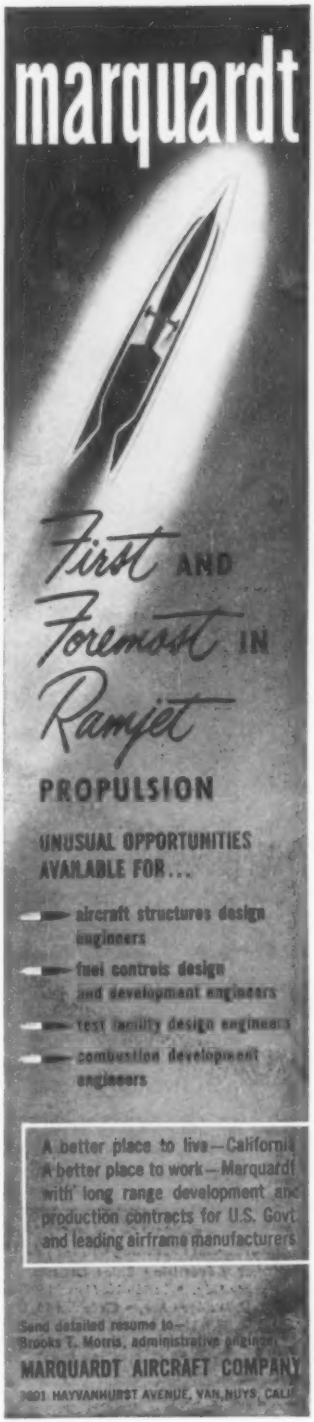
The offering price for the new stock has been set at $21.25 a share and is being made available for purchase to present shareholders at the rate of one share for each ten shares held. A total of 242,988 shares are to be sold under this plan.

The Hughes Tool Co., owning about 75% of outstanding common stock, is expected to take down the entire issue of new shares offered. This will simplify underwriting of the TWA issue.

▶**Continental**—Continental Air Lines has placed in registration an issue of 89,944 shares of new common stock. Less than $720,000 may be realized from this financing at current market prices. In addition, the carrier has arranged a $4,500,000 bank credit to be secured by a chattel mortgage on all aircraft and aircraft equipment. The interest rate will be stepped up to 4½% on this loan compared to 3½% on the previous loan. As of Jan. 31, 1952, bank loans totaled $1,050,000.

Continental's equipment expansion program will entail capital expenditures of about $7,500,000. This will include the purchase of two DC-6Bs and seven Convair 340s. Here, too, depreciation charges and earning power are expected to provide the balance of funds needed to pay for this expansion.

▶**Pioneer**—Pioneer Air Lines' proposed financing has been held in abeyance due to factors beyond its control. The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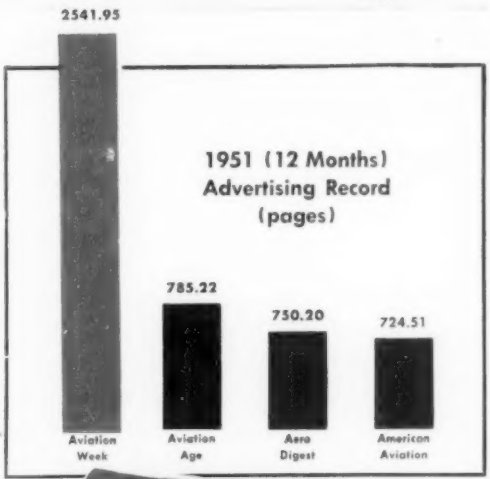

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company had placed in registration a new stock issue of 120,000 shares which was expected to realize between $1,260,000 to $1,320,000. In addition, a five-year bank loan of $2,450,000 had been arranged. As these proceeds were to be applied in purchasing more 2-0-2s the public financing could not take place in view of the Martin financial problems which complicated the delivery of the equipment involved. It appears that this problem has now been resolved and the Pioneer financing can go forward as soon as all details are settled.

Other carriers are likely to attempt public financing soon.

It is only necessary to note the huge capital expenditures planned for new aircraft and supporting facilities in relation to existing financial resources of individual carriers to realize the need for new funds.

The present demands of the air transport industry for new and larger amounts of capital are nothing more than outward manifestations of the growing expansion of the group. None of the presently indicated capital flotations are designed to refund or replace existing debt. All of these new funds are being poured into equipment and physical facilities to serve anticipated demands for increasing air travel.

▶ **Rising Costs**—Present day expansion, however, requires far more new capital than the same number of units cost in the past. The simple transition from a DC-6-B to the DC-7 highlights this increasing cost. The former had a price tag of around $1 million, while the latter entails an expenditure of about $1.6 million per unit. One of these days a turboprop or jet transport will be available and these will run into an estimated capital outlay of more than $4 million per aircraft.

It is a healthy indication that all of the new projected airline capital flotations are being handled through normal private financing means without recourse to government channels, such as the Reconstruction Finance Corporation.

That this financing is being accomplished with investment capital of this nature is a tribute to the basic earning power generated by the airlines. As long as the group's earning power is sustained by natural economic forces, the necessary capital funds will be forthcoming to finance needed expansion. It is for this reason that it remains extremely important that the airlines develop a rate of return on the investment sufficient to attract the required funds in competition with other industries which have capital requirements of their own.—**Selig Altschul**

Saving Weight
TO SAVE MORE LIVES
Upper plexiglas panel is attached to frame in HTK-1 Helicopter by means of Flat-Type SPEED NUTS and machine screws. Detail of vibration-proof assembly is shown at right.

How SPEED NUTS® made important weight savings attaching plexiglas panels in KAMAN HELICOPTER

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"Only one part to handle in assembly means faster, easier attachments. SPEED NUTS are retained in screw-receiving position by finger-tip pressure—no wrench needed to pull down NUTS. *These advantages add up to savings of approximately .15 man-hours per hundred fasteners.*"

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FACTS FOR FILING

With this issue Aviation Week begins a special department designed to furnish readers with reference and source material of permanent value on important phases of aviation. Here will be reported basic facts and figures both newsworthy at the time and of interest at any time. The information will be updated from time to time as necessary. For the convenience of readers who may clip and save this material, the issue date is included with each item.

U. S. Civil Aircraft

State	Number July 1, 1951		
	Active	Inactive	Total
Total	57,798	33,075	90,781
Ala.	505	331	836
Ariz.	659	454	1,113
Ark.	712	447	1,159
Calif.	6,496	3,479	9,975
Colo.	891	442	1,333
Conn.	357	275	632
Del.	142	155	297
D. C.	382	177	559
Fla.	1,316	1,245	2,561
Ga.	598	606	1,204
Ida.	630	266	896
Ill.	3,168	1,768	4,936
Ind.	1,751	1,051	2,802
Ia.	1,705	596	2,301
Kan.	1,756	783	2,539
Ky.	466	291	757
La.	695	453	1,148
Me.	358	236	594
Md.	522	345	867
Mass.	915	402	1,307
Mich.	2,810	1,307	4,117
Minn.	1,425	740	2,165
Miss.	420	313	733
Mo.	1,371	598	1,969
Mont.	796	308	1,104
Neb.	1,326	490	1,816
Nev.	260	125	385
N. H.	149	114	263
N. J.	1,047	714	1,761
N. M.	440	293	733
N. Y.	2,742	1,590	4,332
N. C.	1,001	692	1,693
N. D.	821	464	1,285
Ohio	2,663	1,602	4,265
Okla.	1,280	821	2,101
Ore.	1,190	565	1,755
Pa.	2,639	1,435	4,074
R.I.	109	95	204
S. C.	352	320	672
S. D.	773	238	1,011
Tenn.	552	465	1,017
Tex.	4,320	2,384	6,704
Utah	310	175	485
Vt.	89	65	154
Va.	771	563	1,334
Wash.	1,434	705	2,139
W. V.	370	247	617
Wis.	1,304	791	2,095
Wyo.	327	196	523
Territories and Foreign	791	578	1,369

SOURCE: CAA. *Aviation Week, 3-17-52*

Unionization in the Airframe Industry

Year	Plants		Percent of Unionized Employes		
	With Unions	Without Unions	IAM	CIO	Other
1948	24	9	53.8	44.9	1.3
Oct. 1950	26*	14	64.4	35.3	.3
July 1951	26*	14	66.0	32.5	.5

*No information on unionization was available on three additional plants.

SOURCES: AIA Walsh Healey Act Brief, p. 57; Monthly Labor Review, Dec. 1951, No. 6, pp. 664, 668
Aviation Week, 3-17-52

Membership List

Independent Military Air Transport Assn., 1025 Connecticut Ave., N.W., Washington, D. C.

- President—O. Roy Chalk.

Flying Tiger Line
Overseas National Airways
Trans Caribbean Airways
American Flyers Airline Corp.
Associated Air Transport, Inc.
Capitol Airlines Inc.
U. S. Airlines Inc.
All-American Airways, Inc. (Pitc.)
Trans Ocean Airlines
Caribbean-American Lines, Inc.
Continental Charters, Inc.
Economy Airways, Inc.
S. S. W. Inc.
20th Century Airlines, Inc.
Air America Inc.
American Air Export and Import Co.

Aviation Week, 3-17-52

U. K. Civil Aircraft

Year	Total registered	Regular airways	Charter companies	Private & business	Club flying	Training	Aerial work	Held for resale	Miscellaneous
1938	1,666	120	158	590	279	348	123	48	.....
1945	822	238	11	138	.....	34	51	7	343
1946	1,738	347	332	331	103	139	76	96	330
1947	2,139	287	426	520	232	122	93	306	153
1948	2,286	213	594	628	238	106	100	288	119
1949	2,227	194	429	628	265	73	99	386	153

SOURCE: *Annual Abstract of Statistics, No. 87 (1938-1949).* *Aviation Week, 3-17-52*

Commissioned Federal Airways Facilities

Date	Miles of controlled Federal airways	Number of Commissioned Facilities														
		Control towers	Comm. stats.	Comb. stats. towers	Control centers	ILS	ASR	PAR	VOR	VAR	LF/MF ranges	"H" beacon	H/Y lights	Airway beacons	Intermed. landing fields
June 30, 1947	44,057	124	398	0	29	51	0	0	0	35	360	78	9	1,875	269
June 30, 1948	52,116	140	427	0	31	77	3	3	9	62	371	94	9	1,842	259
June 30, 1949	60,213	158	457	0	30	89	3	3	162	68	376	110	9	1,905	262
June 30, 1950	65,437	167	476	0	30	96	4	4	270	67	377	128	13	1,982	199
June 30, 1951	71,859	184	452	11	32	98	9	9	305	44	378	146	26	936	141
Nov. 30, 1951	74,430	157	444	18	31	97	10	10	347	34	375	148	28	925	136

SOURCE: CAA. *Aviation Week, 3-17-52*

(More Facts for Filing on Page 77.)

From the Birthplace of Phantom Shapes

NEW WATER-BASED WEAPONS

Seaplane research is bringing new phantoms to life in Stevens Tech's towing tanks, testing ground for the U. S. Navy Marlin's advanced hull design.

Delicately instrumented models prove today's dreams for tomorrow's air-sea power at the Experimental Towing Tank, Stevens Institute of Technology

AN instrument-covered seaplane model knifes through the waters of a Stevens Tech towing tank. A Naval Bureau of Aeronautics researcher pores over plans for a jet-powered, swept-wing flying boat. A Martin engineer makes dreams take wings on his drawing board. And, step by step, planes that combine water-based mobility with land-based speed come closer to reality!

Latest product of seaplane research teamwork, today's advanced Martin P6M-1 Marlins add new sinews to our Navy's anti-submarine forces. Their performance is in the tradition of the history-making Martin seaplane flight to Catalina *in 1912*, the famous Martin China Clipper, the dramatic rescues of Mariner patrol planes and the record-load-carrying Mars flying boats of World War II.

Today's seaplane research promises to make their jet-powered successors tomorrow even more potent weapons in America's arsenal! THE GLENN L. MARTIN COMPANY, Baltimore 3, Maryland.

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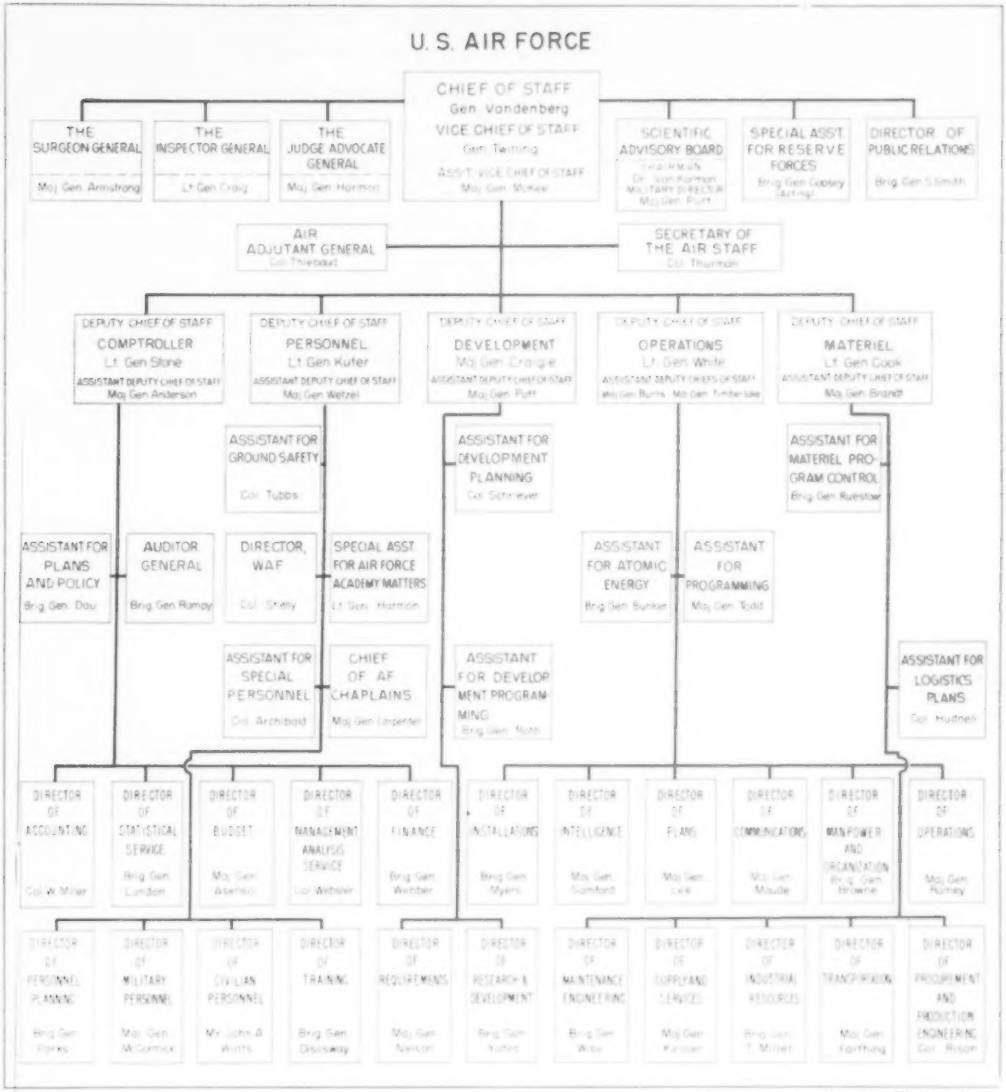


Aviation Week, 3-17-52

United States Air Force Bases Overseas

(As of Jan. 17, 1952.)

- **England** — Bassingbourne; Bentwaters; Brize Norton; Burtonwood; Fairford; Greenham Common; Lakenheath; Marham; Manston; Middenhall; Southorpe; Sealand; Shepherds Grove; Upper Heyford; Waddington; Wyton.
- **Germany** — Erding; Furstenfeldbruck; Neubiberg; Rhein-Main; Tempelhof; Wiesbaden.
- **Austria**—Tulln.
- **Tripoli**—Wheelus Field.
- **French Morocco**—Ben Guerir; Mahar; Sidi Slimane; Nouasseur; Casas; Boulkout; El Djema Sahim.
- **Labrador (Canada)**—Goose Bay Airport.
- **Japan**—Ashiya; Haneda; Itazuke; Iwakuni; Johnson AFB; Kisarazu; Misawa; Nagoya; Tachikawa; Yokota.
- **Okinawa**—Kadena; Naha.
- **Alaska** — Naknek; Elelson; Elmendorf; Ladd; Marks.
- **Aleutians**—Thornbrough; Cape; Shemya.
- **Hawaii**—Hickam.
- **Philippine Islands**—Clark AFB.
- **Saudi Arabia**—Dhahran.
- **Puerto Rico**—Ramey AFB.
- **Newfoundland (Canada)** — Pepperrell AFB; Harmon AFB; Gander AFB.
- **Bermuda**—Kindley AFB.
- **Greenland**—Marsarssuak.
- **Azores (Portugal)**—Lages Field.
- **Pacific Ocean**—Johnson Island.
- **Guam**—Anderson.
- **France**—Bordeaux; Chatteroux; Toul-Rosiere.
- **Panama**—Albrook AFB.
- **Missile Test Center Sites**—Bahamas; Dominican Republic; Puerto Rico.

Aviation Week, 3-17-52

CAB Asks More Control Over Airlines

- **Board wants 11 changes in Civil Aeronautics Act, including power to determine subsidy payments.**
- **And another change would give CAB authority to control issuance of airline securities.**

By F. Lee Moore

Civil Aeronautics Board's annual report for 1951 asks Congress to make 11 changes in the Civil Aeronautics Act, mostly granting the Board more power in economic regulation of airlines. The recommendations:

• **Subsidy for airlines.** First on the Board's list of recommendations is legislation separating subsidy from mail pay. Congress now appropriates money for Post Office to pay subsidy and compensatory mail pay to airlines in a lump. CAB asks Congress to allow the Board to determine subsidies, for which Congress would make appropriations.

• **Civil penalties.** CAB asks Congress for power to impose civil penalties in economic cases. As it is now, criminal charges must be relied on and passed over to a district attorney.

• **Regulate ticket agencies.** CAB wants to broaden Section 411 of the Civil Aeronautics Act to cover unfair practices by ticket agencies and other sellers of air transport. It would expand Section 902(D) of the Act to include ticket agents and make fare rebating by them a criminal offense. CAB has no control over agents now.

• **Foreign airline permits.** CAB wants power to issue permits direct for charter flights to U.S. points by foreign airlines when they're needed. As it is now, a foreign line has to go through hearings to make a flight to a U.S. point not on its regular route.

• **End minor reports.** CAB wants to exempt airlines from the present requirement of filing routine and minor contracts.

• **Flexibilty in mobilization.** The Board wants to be able to free an airline for special mobilization assignments without the necessity of making a study of the effect on the airline.

• **Set fares on international routes.** The Board is still trying to get authorization to regulate passenger and property rates of U.S. lines on international routes. As it is now, the only control CAB has over international fares is through its power to ratify or kill fare agreements of the International Air Transport Assn. CAB does set domestic fares.

• **Standardize state taxation.** An old favorite recommendation of interstate carriers is the plea for Congress to determine some kind of formula for equitable state taxation of carriers. As it is now, taxes of different states on an airline often overlap. CAB has not asked for curative legislation to be introduced this year, a year of states rights, but the recommendation stands.

• **CAB control airline financing.** The Board wants to have control of airline securities issues, "to insure sound capitalization." Airlines now need approval of the Securities Exchange Commission only.

• **Operating permits.** In the Civil Aeronautics Act, a technical detail now obligates foreign airlines to get operating permits through the Commerce Department. CAB asks that this detail be cleared up so the Board issues foreign operating permits.

• **Training expenses.** CAB sends employes to training schools, but it does not actually have positive authorization to do this, although money for the expense is appropriated each year. CAB wants Congress to legislate formal power to train employes in accident prevention and investigation.

CAB's 131-page annual report also outlines current Board policies on fares, nonscheduled airline regulation and other important issues facing it. The Board points out that scheduled domestic air coach traffic in 1951 doubled last year "despite an increase in the rate from 4 to 4½ cents per passenger mile on most coach segments."

The Board now has urged further expansion and has cut the price of coach to 4 cents, generally. The Board also has approved inauguration of trans-Atlantic air coach, starting May 1. CAB reports satisfaction with other promotional efforts such as continued increase in family fare business, round-trip discounts, and directional air freight rates.

On the problem of regulating the "large irregular carriers" CAB points out that it has started an investigation to review its policy. Chief issue in this is CAB's temporarily suspended regulation forbidding a non-certificated airline from flying more than three flights a month between major cities, eight between small cities.

However, in suspending the regulation CAB's annual report says the Board stated "all carriers would be expected to observe the provisions of the existing regulations." The suspended three-trips-a-month regulation thus remains the yardstick by which the Board decides if a carrier is exceeding its authority; the annual report cites the three-trips-a-month regulation as an "attempt to reduce the concept of irregularity to mathematical definiteness."

1952 Air Mail Loss Set at $34.5 Million

Post Office Department will lose an estimated $34.5 million in the current 1952 fiscal year on its domestic air mail service, according to Postmaster General Jesse Donaldson.

He estimated a deficit for the coming 1953 fiscal year, which starts July 1, of $29.3 million. This, though, is based on the assumption that Post Office will have to continue paying airlines mail rates which include subsidy.

Civil Aeronautics Board estimates that the domestic lines will require $24.1 million in subsidy for the 1953 fiscal year. If legislation separating air mail pay from subsidy is enacted and Post Office does not have to meet this obligation, the 1953 domestic air mail deficit would be only $4 million.

► **Other Losses**—The domestic air mail deficit will be small, however, compared with anticipated deficits in other categories for the 1952 fiscal year: Second class mail, $251 million. Third class, $197 million. Fourth class, $114 million. First class mail (exclusive of air mail) is the only category expected to show a profit, estimated at $31.5 million.

The 1950 fiscal year deficit for domestic air mail service was $35.5 million; and the 1951 fiscal year deficit was estimated at $28.1 million.

Other points made by Donaldson in testimony before the House Appropriations Committee:

• **Air mail volume**—Domestic air mail volume mounted 23% in the 1951 fiscal year over the preceding year, the largest increase in any category of mail. It

compared with an over-all increase in mail volume of 3.4%. Post Office anticipates that domestic air mail will show a 6.5% increase in the 1952 fiscal year over the 1951 level.

• **Airline payments**—Payments to air carriers—foreign and domestic—will total $134.6 million in the coming fiscal year, compared with $142.5 million for the current 1952 fiscal year. The reduction is attributed to lower rates for mail transportation by CAB in fixing permanent rates.

• **Trend to air mail**—Railroad mail service is continuing to fall off and airline service is expanding.

During 1952 fiscal year, railroads eliminated 371 trains providing postal service, and on 35 of these railroad routes all train service was suspended. Since 1925, the number of mail-carrying trains has been reduced 65%.

During 1951 fiscal year four new postal air routes were inaugurated, bringing additional air mail service to 108 communities. A total of 789 post offices in the U. S. now have direct air mail service.

Aviation Fuel

- **Airlines protest heavily leaded low-grade gas.**
- **They cite engine damage, say it may be dangerous.**

Airlines will have another hearing within the next month on their opposition to the Petroleum Administration for Defense temporary regulation forcing the airlines to use highly leaded aviation gasoline. Aviation Subcommittee of the House Commerce Committee plans to hear testimony by both the airlines and the Defense Department on their experience with high-lead-content gas. Exact hearing date is not yet set.

Airlines and engine manufacturers claim that the recently required high content of lead tetraethyl in aviation gas causes increased wear and failure rate of spark plugs and engine parts.

Effective last Oct. 15, PAD ordered refiners to supply aviation gas with a minimum of 4.0 milliliters of tetraethyl lead for domestic airlines and 4.6 for international operations. Airlines say the increased lead content not only increases parts and materials requirements, but also may be dangerous.

▶ **What Happens**—In recent testimony before the House Aviation Subcommittee studies presented by Pratt & Whitney's engineer Ed Droegemiller put the problem this way: During engine idling carbon monoxide and dioxide collects. Then, when full power is applied for the takeoff run, the high test engine heat is developed about half way down the runway.

This is where lead in the gas and carbon get together, forming lead deposits on the spark plug points. That causes arcing and detonation, with consequent loss of power. The highest heat, and fouling, occurs about half way down the runway, where power output is highest but speed is still insufficient for air cooling.

Droegemiller said the best way to avoid possibility of excessive lead fouling on takeoff is to use lower content of lead in aviation gas.

▶ **September Answer**—Air Transport Assn. Vice President Milton Arnold testified that ATA is investigating measures to combat the lead fouling, but that it cannot make definite conclusions until September. By that time the Petroleum Administration figures it will be able to drop its lead-content regulation anyway. Deputy Administrator C. E. Davis estimated that PAD might drop the regulation about September if there's no sudden expansion of military requirements.

The PAD regulation increasing lead content was aimed at conserving the supply of alkylate, a high octane ingredient. More lead content ups the octane rating of fuel with less alkylate, thereby increasing effective supply of the ingredient. The airlines, backed by the Civil Aeronautics Board, were able to delay PAD action until last October.

But then PAD Administrator Bruce K. Brown apparently decided to go through with the lead-content increase anyway. Airlines say they were not consulted before the final PAD order was announced.

Air Safety, Noise Probers

Several aviation safety and noise investigations have sprung into being since the series of fatal airline crashes in Elizabeth, N. J. Here are principal temporary and permanent committees and agencies active in such investigations:

• **House Aviation Subcommittee** (Lindly Beckworth) of the House Committee on Interstate and Foreign Commerce: Investigating Elizabeth crashes, New York airport safety, and the noise problem and general safety problems applicable. Held hearings in Elizabeth area last week to receive complaints of local civic groups. Is investigating dangers of highly leaded aviation gasoline, required under current temporary regulation of the Petroleum Administration for Defense. Has also heard testimony on the C-46 transport and on runway visibility problems and has visited New York airports.

• **Senate Committee** on Interstate and Foreign Commerce (Edwin Johnson): Has recommended airline use of preferential runways whenever possible to avoid flying over densely populated areas. Staff is attending House Aviation Subcommittee hearings and is keeping in touch with other investigations.

• **President's Airport Commission** (Gen. James Doolittle): Charged with recommending by June a national airport plan balancing interests of national air commerce and defense on the one hand with peace of mind of residents near airports on the other.

• **National Noise Reduction Committee** (CAA Administrator Charles Horne): Has set up four subcommittees—Technical, Operations, Airports, and Public Education. Chiefs of CAA, CAB, Aircraft Industries Assn., Air Transport Assn., American Municipal Assn., Conference of Mayors and other groups are members.

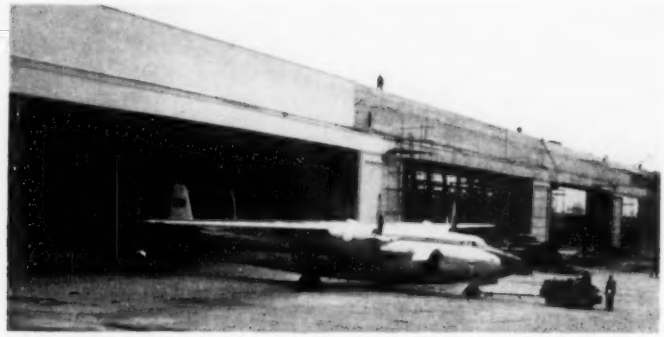
• **National Air Transport Coordinating Committee** (Capt. E. V. Rickenbacker): Formed by the scheduled and nonscheduled airlines to handle the N. Y. airports emergency created by the closing of Newark Airport. Committee re-schedules all flights in the area on a voluntary basis. Has formed a subcommittee to work with the House Aviation Subcommittee. Scope of work now expanded to deal with preferential runway use and other national airport problems of resident safety and noise nuisance.

Avianca Merger Set

(McGraw-Hill World News)

Bogota—Avianca has nearly completed merger arrangements with SAETA (Sociedad Aerea del Tolima) that gives the former control of practically 100% of Colombia's domestic civil aviation. There will now be just one small passenger carrier (SOTA of Cali), and one cargo line (SAM of Medellin) outside Avianca.

In this latest in a steady series of Avianca mergers, the big airline purchased all of SAETA shares offered at par and is taking over all the equipment. Avianca had a 25% SAETA interest.



AMBASSADOR poses in front of new BEA London hangar where planes will be housed.

Ten Ambassadors Due in April

(*McGraw-Hill World News*)

London—British European Airways has been promised delivery of the first ten Elizabethan class Ambassador transports in April. Another ten will be delivered by de Havilland Aircraft next fall.

The much delayed Ambassadors were supposed to have gone into service with BEA last year. BEA's chief executive, Peter Masefield, recently said that almost half of BEA's £1.26-million ($3.5 million) deficit in 1951 was due to delays in the delivery of the Ambassador. Latest trouble has been overheating of the cabin.

The 49-seater Ambassador will be fed into BEA's London-Paris run first. The planes will come just in time to help out on BEA's expanded summer services.

BEA's fleet of 49 Vikings are being refitted in anticipation of tourist fares on the London-Paris run next fall. At short notice the aging Vikings will be capable of being made ready to perform any one of five duties:

- 24-passenger luxury liners with reclining seats, hot meals and a bar;
- 27 seat hot meal and bar version;
- 34-passenger, cold meal and bar version;
- 38-seat tourist version with light refreshments provided;
- A two-class version with 12 cheap fare seats in a forward cabin and 15 reclining seats in the after cabin.

BEA still expects to be carrying the bulk of its traffic in Vikings for some years to come.

The recent announcement of the British Treasury limiting the allowance of Britain's holiday makers to £25 ($70) is bound to cut into BEA's revenue this year, but BEA chairman, Lord Douglas, doesn't think the loss will be very much. He hopes to make up some by luring more foreign customers and by increasing services to sterling area resorts—Gibraltar, Malta, Cyprus—where the travel allowance does not apply. Also additional coach fare services on BEA's continental runs will be announced soon. So far only BEA and Air France have concluded an agreement.

India Planning Transport Purchases

(*McGraw-Hill World News*)

Bombay—A hotly contested series of demonstrations between the Convair 340 Convair-Liner and the British turboprop-powered Vickers Viscount is in the cards for May and June—with the fakes representing potential orders for a minimum of 15 planes.

India's eight privately owned air carriers have recommended that the government appoint a technical commission to oversee the trials and make the decisions.

It is likely that the winner will be asked to set up a central spare parts and maintenance organization in India, build an overhaul base, and agree to accept cancelation of his order "if any major difficulties come to light in the operation of the aircraft elsewhere" between contract and delivery. Winner may also be asked to bear the cost of modification, due to design defects, necessary within 12 months of delivery.

The Viscount's four-engine layout is believed to hold some favor among operators who see it providing a greater safety margin that the 340 twin-engine design.

Meanwhile, a Douglas Aircraft Co. representative reports that Indian Air Force officials are interested in the Super DC-3 and may ask their government to have IAF DC-3s converted at the Bangalore Aircraft factory.

Pilot Pay Raises Of 11-14% Approved

Wage stabilization officials have approved pilot pay raises of 11 to 14% granted in recent contracts by eight major airlines—American, United, TWA, Eastern, Capital, Braniff, C&S and Continental.

Said the Railroad and Airline Wage Board: "Use of the Jan. 15, 1950, base period for measuring changes under the stabilization program was clearly inapplicable." RAWB points out that pilot pay structure hadn't changed since 1947-1948. And the Board also says there've been "substantial changes in flight equipment and composition of the labor force during the past two or three years." Pilot labor contracts had expired in 1949.

RAWB also bases its conclusion on the fact that the old pay formula for copilots is obsolete. It cites the Presidential Emergency Board findings and recommendations on the American-pilot dispute; here the Emergency Board urged that copilots be placed on a pay plan which "will parallel that of the first pilots as closely as possible." The Emergency Board recommended that copilots should get flight pay at 55% of captains' pay. The contracts settled thereafter set copilots' flight pay at 40 to 50% of captains' pay.

RAWB approves the fringe benefits as well as pay raises which were won by pilots in this recent round of new contracts.

The Board says the pay hikes of 11 to 14% are permissible under the so-called "base period abnormality provision" of General Wage Regulation 6, and the cost-of-living provision of General Wage Regulation 8.

SHORTLINES

▶ **Air Coach Transport Assn.** is holding a second general membership meeting of nonscheduled airlines Mar. 31-Apr. 5 in Washington.

▶ **Air Coordinating Committee** has decided to keep most of the low-frequency navigation ranges going until at least July 1 of next year, and probably much longer. Military requirements are cited as the main reason—especially possibility of national mobilization.

▶ **Braniff-Mid-Continent Airlines** officials have been inspecting key cities on MCA's routes, preparing integration of the two systems in pending merger. Braniff President Thomas E. Braniff has toured MCA with executives of both companies, including MCA chairman

Thomas Ryan and President J. W. Miller.

▶ **California Central Airlines** traffic the first two months this year has more than doubled a year ago—up 126% to 27,772 passengers carried Jan. 1-Feb. 24. The 10,994 passengers carried in 24 days of Feb. more than tripled traffic of Feb., 1951.

▶ **Northwest and Capital Airlines** plan to submit to CAB their final definitive merger contract this month. They already have started plugging each other's name in ads and ticket sales. Observers look for CAB approval to finalize the merger before the end of this year.

▶ **Central Airlines** asks CAB for an exemption order to serve a new route between Dallas and Oklahoma City before final CAB disposition of this route application in its certificate renewal proceeding heard by the Board in January. Defense Dept. favors Central service on the route, Central says.

▶ **Civil Aeronautics Board** has merged the Routes division and Carrier Relationships division of its Bureau of Air Operations into a single Routes and Carrier Relations division, with Routes Chief G. Bernard Slebos as head. Two under-sections are Carrier, Services and Agreements, headed by A. M. Andrews, and Certificates section, under H. R. Sanderson. Former Carrier div. Chief S. B. Smith will do special assignments for Bureau Chief Gordon Bain.

▶ **Commerce Dept.** Secretary Charles Sawyer has won approval of surface and air carrier representatives to form a council to "advise Commerce on transport matters outside the regulatory field." First meeting is slated for Apr. 29. Sawyer emphasizes that "Commerce has no responsibility for regulatory agencies in the domestic transportation field." Spokesmen for air, rail, highway, ocean and waterway carriers, plus shippers, pipelines and freight forwarders approved the council plan.

▶ **Council for C-46 Engineering** will be heard in oral argument vs. CAA (on the regulation reducing C-46 gross load) before Civil Aeronautics Board Mar. 25. Both parties have filed briefs. CAA's brief took strong exception to the findings of fact made by CAB Examiner S. T. Simon, who found CAA engineering and flight test reports on the C-46 inaccurate and incomplete.

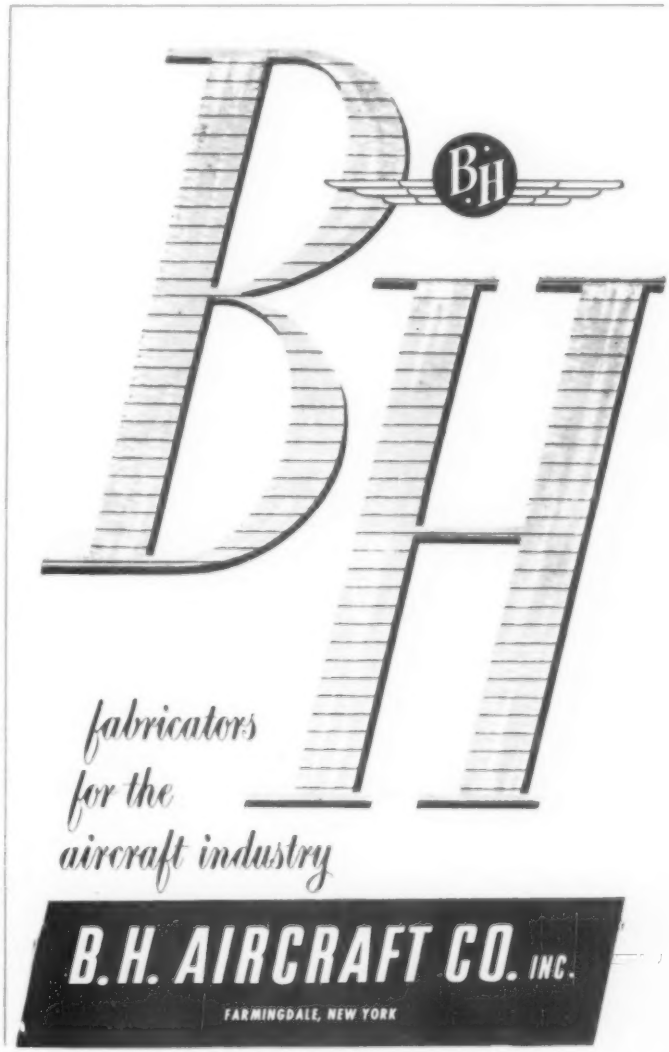
▶ **Eastern Air Lines** is now slated to get 16 compound-engine Super Constellations starting this fall, instead of the summer of 1953 as formerly scheduled. EAL should receive the last of its 14 regular Super Connies this month.

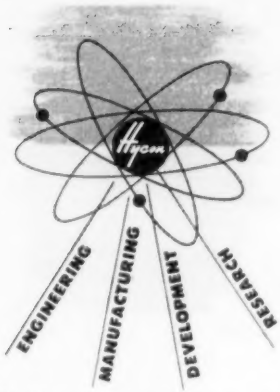
▶ **Northwest Airlines** plans to cut more than six hours from Washington-Tokyo flying time with start of Stratocruiser replacement of present DC-4 service Seattle-Tokyo and the Far East over the great circle route via Alaska Apr. 27. Present time from N. Y. or Washington to Orient is about 38½ hours.

▶ **United Air Lines** President W. A. Patterson states in UAL news that "our coach service between Los Angeles and San Francisco operates at a loss. The service north of San Francisco and the transcontinental service are showing a modest profit. Reason for this profit is that the DC-4 airplanes are practically written off our books and there is not much diversion from first-class service because of the slower speed on the DC-4 and its lack of pressurization."

▶ **Pan American World Airways** pilots have at last agreed to arbitration on their 2-year-old seniority squabble (old-time PAA pilots vs. former American Overseas Airlines pilots merged by PAA two years ago). Arbitrator is David L. Cole, chairman of the recent AAL Presidential Emergency Board.

▶ **Wisconsin Central Airlines** has bought three more 21-passenger DC-3s, making total fleet 10 DC-3s. Planes come from TWA and Eastern, who are replacing them with Martin 4-0-4s.





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LETTERS

Praise

The editorial, "Magnificent," about Mrs. Patterson, has been read by many of my friends who are non-aviation people and at the present time the minister of our church is asking for my copy.

More power to "Cockpit Viewpoint." I have flown for 20 years on light aircraft up to 450 hp. and I have yet to experience abuse from an airline pilot. Yet some people in private and commercial flying try to inform me that the airline pilot feels he owns the air. This I do not believe. It would be interesting if Capt. Robson some time wrote on this point of view. I think if any feeling exists it is due to the abuse of instrument flight by the private pilots, and it is, of course, the less experienced who will put themselves in an instrument situation on single-engine equipment. However, tell the captain not to interrupt his series on PPI, ILS and GCA.

W. B. Sterling, Aviation Geography
State Teachers College
Bloomsburg, Pa.

I want you to know how much we appreciated George Christian's article, Feb. 4. It was not only good from our standpoint—it was accurate. Thanks so much for a very fine job.

Les Kinsolving
Director Public Relations
The Flying Tiger Line, Inc.
Lockheed Air Terminal
Burbank, Calif.

I would appreciate your permission to reprint the article "Bell Employs 1,326 handicapped," which appeared in Aviation Week, Feb. 18.

Mort Friedlander, Editor
The Foreman's Digest
Mystic, Conn.

Isn't there some wild chance that A. W. Jessup's "MiG-15 Dims USAF's A-Bomb Hopes" be printed in the press nationally? He sure has the knack of bringing forth the true situation.

Keep up the good work.

J. E. Blaney,
Route 2
Des Moines, Iowa

Your story on the compound engine was extremely well done and I marvel at your ability to gather from the hodgepodge which you were given a story which contained so much fact and detail. It was definitely a good job . . . .

Frank H. Hankins, Jr.
Service Manager
Curtiss-Wright Corp.
Wright Aeronautical Div.
Wood Ridge, N. J.

The article, "Turbo Compound: Transport Fuel Saver," in the Feb. 18 Aviation Week is excellent. George Christian did an outstanding job of reporting on this rather complex and technical subject, and his interpretation of the facts and information he obtained during his visit to Wood Ridge is not only accurate, but clearly and concisely written.

K. C. Mehrhof,
Public Relations Manager
Wright Aeronautical
Div. of Curtiss-Wright Corp.
Wood Ridge, N. J.

History Repeats

Some years ago I was in a museum in New Orleans and saw a poster on the wall and obtained a photostat of it, which I enclose. I was reminded of it when I saw the newspapers announcing closing of Newark Airport.

I have been under the impression that

MOTHERS LOOK OUT FOR YOUR CHILDREN!
ARTISANS, MECHANICS, CITIZENS!
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LOCOMOTIVE RAIL ROAD!
SUBURB OF NEW YORK!!
RALLY PEOPLE in the Majesty of your Strength and Send THIS
OUTRAGE!

the distance from Elizabeth to Newark has never changed and that airplanes are getting safer, and the coincidence of three major accidents within 20 years occurring within two or three months from unrelated causes should not be any more justification for hysteria than stopping the railroad from going through the city where this handbill was distributed, which I believe is Philadelphia.

Richard M. Mock, President
Lear, Inc.,
Grand Rapids, 2, Mich.

Praise for a Pilot

For a magnificent view of some of the most awe-inspiring scenery in America, coupled with as fine a "rubber neck" tour commentary as one might wish, I recommend AAL Flight 918 out of San Francisco, especially if Capt. R. J. Rentz is at the controls. Within a couple of hours he will show you more notable places and give you more folklore about what you see than you could acquire in a week of ground travel.

From the time he begins telling you how the Delta-Mendota Canal of California's Central Valley Project makes a river run up hill until he signs off over New Mexico he keeps up a rapid-fire description of what

the passengers see. Along with it he passes out a choice collection of geological, historical and geographical items of interest. He dips a wing over Yosemite Valley so that you may look directly into that glacial chasm and tells you that although the Sierra Nevada are over 14,000 ft. in elevation, sea shells may be found in the rocks along the crest indicating that it was once ocean bottom.

A few minutes later he points out the highest and lowest places in the 48 states—Mt. Whitney (el. 14,427 ft.) and Bad Water in Death Valley (el. —280 ft.). Hoover Dam, Lake Mead and the Grand Canyon of the Colorado pass in review. The canyon, says Captain Rentz, is the greatest example of erosion in the world. The water in the river, he reports, "is too thick to drink and too thin to plow."

When he dips a wing again you are over Havasupai Canyon and he tells you that the isolated Havasupai Indians have raised their sheep and grown their corn in this mile-deep gorge for 550 years. (From his description I knew that he too reads the National Geographic.)

His final pitch is worthy of an advertising agency copy writer. I give it to you as I wrote it down:

"While this flight from San Francisco through Dallas to New York, over the sunny southern route, takes 50 minutes longer than a direct transcontinental route, it carries you over seven national parks and monuments, making the extra time well worthwhile. We hope that you have enjoyed it and, if you have, that you tell your friends about it so they too will ride American."

For my part I hope plenty of people tell AAL President C. R. Smith how Captain Rentz and his fine crew are building good will for American and for air transportation.

George G. Tenney
Regional Vice President &
District Manager
Pacific District
McGraw-Hill Publishing Co.
San Francisco, Calif.

'Scare Headlines'

My heartiest congratulations for your courage and far-sightedness in placing your editorial concerning unfair headlines in Editor and Publisher. The industry is greatly indebted to you for the straightforward approach you have taken to this serious problem.

T. H. Davis, President
Piedmont Aviation, Inc.
Smith Reynolds Airport
Winston-Salem 1, N. C.

Censorship

. . . Your 60 day trial of censorship in connection with the XB-52 is an extremely interesting experiment and I'm looking forward to the results.

I plan to make mention of it this week in our columns. . . .

Robert U. Brown, Editor
Editor & Publisher
Suite 1700 Times Tower
New York 18, N. Y.

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P-3621, Aviation Week
330 W. 42 St.,
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P-3581, Aviation Week
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P-3532, Aviation Week
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814	35814	Blower Ass'y
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175	48363	Shaft
56	48392	Sump
390	48461	Gear
78	76236	Gear
1178	84289	Bearing
113	84487	Housing
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700	TFD 8600	Thompson	Fuel Booster Pump
125	D7818	Adel	Anti-icer Pump
50	2P771-A	Pesco	Fuel Booster Pump
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20	47B23	Lewis Eng.	Temperature Ind.
36	47B24	Lewis Eng.	Temperature Ind.
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90	JH950-R	Jack & Heintz	Starter Motor
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1000	13018-A	Bendix	Interphone Box
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188	EYLC-2334	Barber-Colman	Control
11	12086-1C	Eclipse	Amplifier
174	450-0	Skinner	Gasoline Filter
250	558-1A	Eclipse	Oil Separator
100	716-3A	Eclipse	Generator (NEA-3A)
37	117-47	Edison	Detector
89	318	Edwards	Horn
20	794-F	Stewart-Warner	Heater
280	921-B	Stewart-Warner	Heater (200000 BTU)
340	981280	Kidde	Co2 Cylinder
85	12924-2	Adel	Lock Valve
90	923748	Kidde	Oxygen Cylinder
80	DW28	Eclipse	Transformer
97	6041H-146A	Cutler Hammer	Relay (B-12)
22	0655-D	Aro	Oxygen Regulator
148	PG908AS1	Minn. Honeywell	Air Ramp Switch
33	DW47	Eclipse	Transformer
11	DW33	Eclipse	Transformer
65	ASDC2	CO2 Mfg. Co.	Fire Detector
750	ND21	American Gas Accumulator Co.	Time Delay Relay
30	U6005-DV5	United Air Prod.	Oil Temp. Reg. 5"
29	UA-3160	United Air Prod.	Oil Temp. Reg. 6"
95	UA-3160C	United Air Prod.	Oil Temp. Reg. 6"
73	UA-6007-CF-DV5	United Air Prod.	Oil Temp. Reg. 7"
14	UA6009-S-30	United Air Prod.	Oil Temp. Reg. 9"
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EDITORIAL

How Some CAA Men Swindle U.S.

(The following story is reprinted from the New York Journal-American and shows another phase of the deterioration in the Office of Aviation Safety, vital safety enforcement unit of the Civil Aeronautics Administration. The reporter in this case was Guy Richards.—R. H. W.)

The federal government is being swindled out of hundreds of dollars in liquor taxes by airlines flying rum and whiskey from the West Indies, "off the manifest," as a favor to some of the cops of the airways—inspectors for the Civil Aeronautics Administration.

The public is being swindled out of hundreds of big and little safety crackdowns by those inspectors whose jobs is to enforce the CAA regulations.

The connection between the two swindles is direct and appalling, a sustained investigation by the N. Y. Journal-American has disclosed. The first sets the stage for the second.

NAMES NAMED

CAA inspectors who have been favored by the "service" are often the ones who get a grounded plane or a penalty-hounded line off the hook swung by a conscientious inspector.

The insidious practice which has divided CAA inspectors at the airport level into warring camps, and sold the public down a river of alcohol, is long overdue for exposure.

But before getting down to details, and in justice to those not involved, it should be pointed out that not all CAA inspectors are involved, by any means; that though the chief victims of the racket have been the nonskeds, the skeds have also been fleeced; and that in many cases we have looked into, it appears that the higher-ups of the lines—the executives above the operating level—have often not been aware of it.

Here's how the smuggling routine operates:

CAA inspectors (known as safety agents) in Puerto Rico, a territory of the United States, buy rum at wholesale prices from local producers.

They also purchase the different brands of Canadian, British and French liquors at bargain prices in the free port of Charlotte Amalie, on the Island of St. Thomas, in the Virgin Islands.

The Virgin Islands are administered by the Department of the Interior. The airport at St. Thomas was named—possibly with more ironic prescience than was realized at the time, before mink coats and now liquor, hit the newspapers—the Harry S. Truman Airport.

Every case of this liquor is subject to the U. S. Internal Revenue tax of $10.50 a gallon before it can enter the United States.

In order for the inspectors to send that liquor here, from or through Puerto Rico, they are supposed to pay the above tax to the U. S. Customs at Puerto Rico.

The shipment then—according to law—must be listed on the plane's manifest.

When the plane arrives in the States, the pilot presents the manifest to the Customs inspector who automatically okays the shipment, inasmuch as it has been "pre-inspected" in Puerto Rico.

It is a common practice, this newspaper has established, for the CAA men in Puerto Rico to skip paying the tax by getting the pilot of a plane (more often a nonsked) to transport the liquor without listing it on his manifest.

When the plane arrives at one of the metropolitan airports here, the Customs officials look over the manifest, but they have no way of knowing that the liquor is aboard the plane.

NO CARGO EXAMINATION

They are not required to examine the cargo here because of the fact that Puerto Rico is a territory of the U. S. and does not come under this country's Customs duty regulations.

All this has left the neatest niche in the world for bringing in a flood of cheap liquor by air to the favored CAA network. And it has, indeed, been a flood.

One maintenance man for a nonsked coming into Newark from Puerto Rico and Miami, reported the delivery to him, for CAA men here, of over 150 cases in the last couple of months.

"We could have used that weight, too," he complained.

500 CASES A MONTH

All told, the smuggling operation probably averages from all lines about 500 to 700 cases a month, for deliveries to CAA operatives from Miami to New York and as far away as OKLAHOMA.

The culprits who are most readily revealed are the agents in Puerto Rico, but it is very likely that they have in some of their activities served as pawns in providing higher officials in the CAA's seven continental regions.

The CAA smugglers also use another dodge to beat the tax. They claim that as a government employe under Public Law 633, they are allowed to bring in liquor tax-free.

Actually, most of those who use this dodge are entitled to no such consideration. P. L. 633 applies only to government workers who are returning home from assignment abroad. Such workers are allowed to bring in cases of liquor tax-free for their personal use.

Yet CAA inspectors make a habit of using P. L. 633 to skip the tax through the "cooperation" of Customs inspectors in Puerto Rico.

For example, on Jan. 6, 1951, George J. Harlow, CAA inspector at San Juan, Puerto Rico, got a tax-free clearance from U. S. Customs to send two cases of rum to Teterboro Airport on a nonsked plane.

Harlow was then resident inspector there and he still is, according to CAA.

On the Customs declaration that accompanied the spirits was this "okay" from the Customs officer at Puerto Rico:

"Two cs (cases) rum passed free under P. L. 633."

That little notation saved Harlow—or whoever was actually getting the rum from Harlow—$50 in taxes.

DELIVERED IN QUEENS

In further violation of the law, when the rum was hauled off the plane, and delivered to a CAA agent at Teterboro, Harlow wasn't with it. The rum ultimately was delivered to a maintenance engineer at the offices of the CAA's Region 1 headquarters, at Idlewild Airport, Queens.

Harlow also works through the International Airport at Miami.

On Jan. 29, two cases of Canadian whisky, bought tax-free at St. Thomas, was delivered to the Miami Airport by Matthew Windhausen, a pilot on whom Harlow—never one, apparently, to pass up an opportunity—imposed the duty of flying in liquor to the United States.

Windhausen was flying a Twin-Beech plane.

At Miami, Deputy Collector of Customs Arthur Brantley questioned the arrival of the two cases in the United States without any evidence that the Internal Revenue tax had been paid.

LIQUOR IMPOUNDED

The spirits were impounded. They are awaiting the arrival of Harlow in Miami to claim the liquor and prove that the tax was paid.

"It seems peculiar," Brantley told this newspaper by phone, "that the whisky should arrive without any evidence that the tax was paid.

"Usually, Internal Revenue stamps are pasted on the cases, but this shipment had no such stamps. I'll hold this liquor until he (Harlow) furnishes proof. If he doesn't the whisky will be sold at the end of the year with the proceeds going to the Government."

Matthew Windhausen, the pilot of the plane, was reached at the Syracuse Airport, where he runs an air repair station. He said it was an everyday occurrence for CAA men to have tax-free liquor flown to the United States on private and nonsked planes.

"If you think that's bad," he said, "you should see what the Army and Navy does. They fly it up in wholesale lots!"

HINDERS CRACKDOWN

As far as the public is concerned, there is a difference, however. The smuggling courtesies extended to the CAA puts its inspectors under obligation to the airlines, in matters of crackdowns, and establishes a "credit in the bank" to be drawn on, against the public interest, whenever the matter of an enforcement or a grounding comes up.

This newspaper has determined that the smuggling operation has much to do with explaining a common experience at many airports. One inspector grounds a plane for something. There's

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(Continued from p. 88)

a palaver. The pilot digs up another inspector, senior to the first, and the grounding is over.

Or one plane cleared in Newark is grounded, in the same condition it left Newark in, at another airport.

But the nonskeds are not the only accomplices in the racket.

PURCHASED LIQUOR

On Jan. 31, a CAA inspector boarded a sked DC-4 at Belem, Brazil. At Trinidad, he bought two cases of liquor and placed them on the plane for free carting to the United States.

At Trinidad, this inspector checked the condition of the plane and found that it had faulty flaps which drooped in flight, due to a flaw in the hydraulic system.

The plane should have been grounded, according to CAA regulations, but evidently the inspector was afraid to do so for fear the pilot would turn the liquor over to Customs men at Puerto Rico for tax.

So—it has later been charged, in a formal complaint to CAA—he let the plane go through with its faulty flaps and got his rum through tax-free.

The CAA spokesman in Washington stated that the Trinidad story was "under investigation right now," but said that the Puerto Rico and St. Thomas activities "were all news to this office."

It is no news at the airport level here, however.

SAFETY AND POLITICS

It represents politics at work in the local areas, in the field of safety enforcement, which compares with the high-level politics described yesterday and at work—mostly behind the scenes—in ways that the public rarely knows about.

Primarily it is due to the decentralization of the vast CAA, leaving the morale and moral courage of its inspectors to the leadership of the regional administrator. There are tight areas and there are soft areas.

This is a soft area—and it is the scene of the greatest air transport activity in the nation.

FRAUD IN WEIGHT

One more point and we are ready to turn to the next installment. That point is the addition frauds of the liquor smuggling racket in terms of air freight weight.

A case of Puerto Rican rum weighs as follows, when packed:

A case of 12 bottles of fifths—34½ pounds.

A case of 12 bottles of quarts—43½ pounds.

The Forgotten Oath

The smuggling story above is an incredible report. But AVIATION WEEK is finding other incredible conditions in CAA's Office of Aviation Safety too. These too will be reported.

It may be worth noting that CAA's chief information officer, mixing with reporters the night of Feb. 12, was laughing off the Journal-American story, instead of promising an investigation and clean-up. His attitude was: What citizen doesn't try to bring some booze into the country sometimes? The scene was the Commodore Hotel, where press men—including a representative of AVIATION WEEK—talked to participants in a safety meeting of airline and N. Y. Port Authority executives.

Can Aviation Safety Agent Harlow; OAS Director Ernest Hensley; his deputy, William Davis; CAA's press chief, and certain others have forgotten the oath they took when they entered federal service?

Let's refresh a few memories and repeat it here:

"I (name) do solemnly swear that I will support and defend the Constitution of the United States against all enemies foreign and domestic; that I will bear true faith and allegiance to the same, that I take this obligation freely without mental reservation or purpose of evasion; that I will well and truthfully discharge the duties of the office on which I am about to enter so help me God."

Crashes & Perspective

Massachusetts Mutual Life Insurance Co. is circulating a thought-provoking editorial on commercial air line safety. It puts sensational newspaper headlines in refreshing perspective.

Also proving its faith in air travel, Continental Casualty Co. has doubled its maximum air-trip accident insurance offered to scheduled airline passengers. A passenger can now buy $50,000 indemnity for $2.50, whereas he could buy only up to $25,000 at $1.25 before. Associated Aviation Underwriters is expected to follow suit.

In announcing the increased coverage available to passengers, Continental placed an ad in the general press titled, "Open letter to the scheduled airlines of America." It stated that the recent accident crash at Elizabeth, N. J., was only coincidence but that the general public might not realize that. "We know of only one way to prove that we have nothing but faith and confidence in your (the airlines') ability to carry those passengers safely," the letter stated. "Therefore, effective immediately, we are doubling the amount of our air trip insurance."

"If you travel by air today, you probably know that extra premiums for ordinary passenger flights have been eliminated," the Massachusetts Mutual leaflet says.

"Extra premiums for pilots and crew members have been reduced to almost one-tenth of what they were.

"Such insurance rates furnish a better index of contemporary progress in aviation than headlines reporting occasional airplane disasters."

Insurance companies know their mortality statistics. You can't bribe them or cajole them into cutting rates unless there is good reason for doing it. You can't panic them with sensationalism.

All aviation accidents are bad. Aviation must keep fighting to improve its record. But let's not ever permit distortion of the record. Massachusetts Mutual and Continental Casualty are helping us show the record as it is.

TV & Sensationalism

We have had several indignant reports from readers on an inflammatory television show on NBC the night of Feb. 1, during the Elizabeth hysteria.

A "news" program sponsored by a cigaret firm and conducted by John Cameron Swayze put on a roundup with stock pictures of a number of major airports throughout the country, including Cleveland, Willow Run (Detroit), Kansas City and Los Angeles.

According to Swayze, not only Elizabeth was up in arms about nearby airports. Agitation was developing in Detroit to move Willow Run and in Cleveland. "He painted a big story of excitement," one Detroit reader tells us. "So far as Willow Run—25 miles out in the country—is concerned, 'excitement' just doesn't exist here." We hear the same from Kansas City and Cleveland.

We hope TV doesn't give birth to the same kind of sensationalism that a noisy minority of the daily press has adopted. Let's keep our eye on Mr. Swayze and others like him.

—Robert H. Wood

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AT WORK IN THE LABORATORY

Sperry Klystron tubes are doing heavy duty in the labs where a practical source of continuous microwave energy is needed for general test and measuring work. A complete line of 2K tubes is available for bench oscillator use from 2660 to 10,300 mc.

Stemming from its sponsorship of the development of the Klystron in 1939, Sperry has had many years' experience in the manufacture of these tubes. Besides the 2K-series for laboratory use, other Sperry Klystrons include transmitting tubes for microwave relays, radars (both pulsed and cw), radar beacons, aeronautical navigation (DME and ILS), and radio communication systems. Other Sperry Klystrons are used as local oscillators in radar and microwave communication receivers. Klystron multiplier tubes are used in frequency standards and for other applications where crystal control at microwave frequencies is desired.

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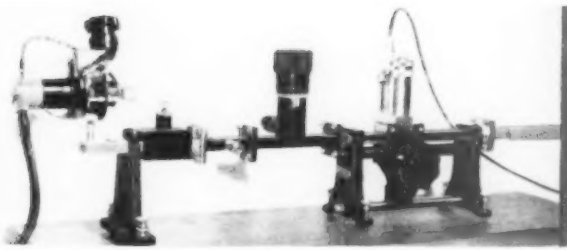

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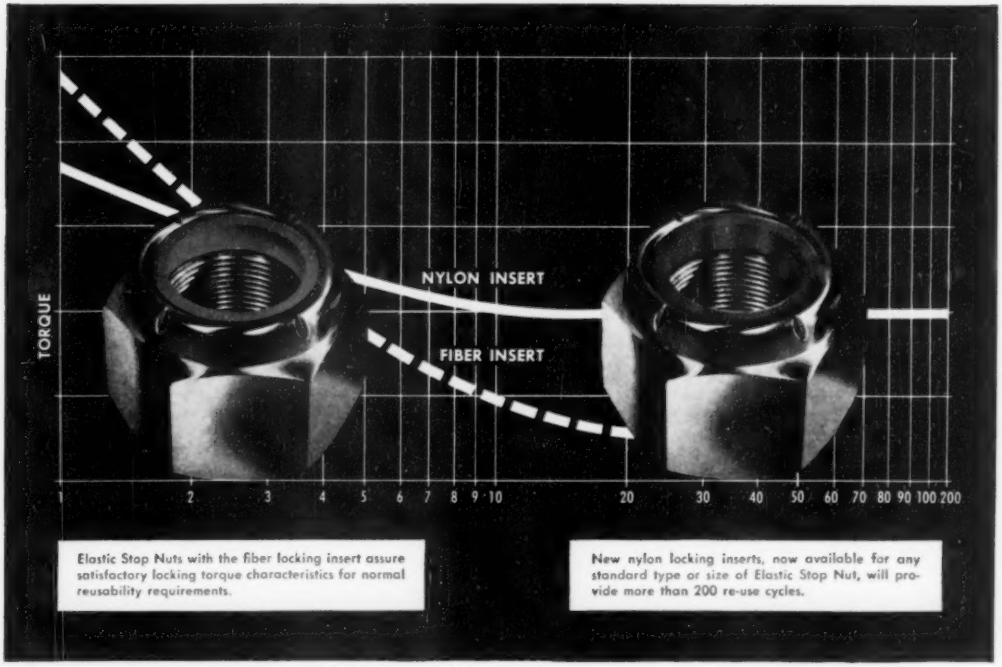
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